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Grades VII and VIII
Curriculum Guide

for

SCIENCE

1959

GOVERNMENT OF THE PROVINCE OF ALBERTA
DEPARTMENT OF EDUCATION

1959
Gr 7-8

COURTESY ALBERTA GOVERNMENT PHOTOGRAPHERS

STUDYING THE BASIC ANIMAL FORM

Acknowledgement

The Department of Education acknowledges with appreciation the contributions of the following committee members to the preparation of this curriculum guide for Junior High School Science.

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Preface

The final draft of the old Junior High School Science outline was introduced in 1951. In 1957, only six years later, the rapid advances that had taken place in science made necessary a complete revision.

From the outset it was realized that a re-shuffle of the old material was not enough but that sweeping changes were required. In particular, there was a need for the strengthening of content and for a change in the general approach to the teaching of science. As a result, the new outline contains much material for each grade formerly found in a higher grade. Furthermore there is a new emphasis on critical thinking on the part of the pupils and a demand for more experimentation and demonstration conducted by pupils as well as by teachers.

Preliminary notes and discussions have been cut to the bare essentials in this guide. However, in order to establish and maintain a reasonably high minimum standard of teaching the instructions regarding content, suggested treatment and sources of information are given in detail.

This science outline, the 1959 edition, deals with the teaching of science in Grades VII and VIII. The course, largely in its present form, was used experimentally in nine schools in the 1958-59 school year. In September of 1960 a new Grade IX course outline, also an interim edition, will be introduced and in September, 1962, a final draft, consisting of the outline for Grades VII, VIII and IX, will be authorized.

Primary Considerations

What is Science?

Science has two meanings: first, it is a body of organized knowledge; secondly, science is a method of solving problems.

There are many sciences or organized bodies of knowledge such as physics, chemistry, botany, zoology, geology and mathematics. Each has its own set of facts and its own technical vocabulary. All have the scientific method in common.

Why Teach Science?

Science teaching should begin with the consideration of facts. However, when this has been done the task has just begun. The facts must be used to lead the pupils to an understanding of scientific principles and to the development of generalizations.

Along with this there should be the development of: a scientific attitude, skills, habits, the ability to solve problems scientifically and an appreciation of the contribution of scientists.

What is the Scientific Method of Solving a Problem?

The scientific method is an organized plan for solving a problem. Here are the essential steps:

(1) The scientist first defines the problem. He usually lists what he knows about the problem and then isolates the unknown factor or factors in the light of all the known facts.

(2) The scientist next formulates a hypothesis.

(3) The next step is to test the hypothesis by experiment. If the experimentation fails to verify the hypothesis it is discarded and a new one is set up. The process is then repeated until the hypothesis seems to be true. The hypothesis is usually accepted as valid when a number of experiments support it.

(4) The final step consists of checking the tentative conclusion with the results obtained by other scientists.

What is the Scientific Attitude?

These characteristics are commonly associated with one who has a scientific attitude:

(a) He has an INQUIRING MIND.

(b) He is CAREFUL and ACCURATE in his work.

(c) He is IMPERSONAL in his attitude towards a problem; he is unswayed by superstition and prejudice.

(d) He is OPEN-MINDED. His hypotheses are discarded or altered if they do not agree with new facts.

(e) He is CRITICAL. He continually asks himself questions such as "Can I rely on these facts? What is their source? Am I equally critical of my own thinking?"

(f) He is SKEPTICAL although he respects the work of experts.

Making Science Teaching More Effective

Science teaching can be made more effective by applying the following principles:

1. The teaching should begin where previous experience and learning have left off and should take into account the needs of the pupils.

2. The teacher must establish definite goals within each unit. Interest may be aroused by discussion, questions, visual material, the posing of problems and relating the work to the students' own experiences.

3. Teaching is most effective when the pupils are encouraged to do their own thinking. Scientific principles cannot be taught as facts to be memorized, but must be a product of the pupils' own mental processes. Pupil experiences should be centered about specific generalizations which will be arrived at largely by careful observation and conclusion on the part of the pupils themselves.

4. The more the facts and laws learned are applied, the better they are understood and the more likely they are to be retained. (This principle of use is an extension of number three.) The frequent consideration of problems and exercises involving the generalizations previously learned reinforce understandings.

5. A good science teacher realizes the importance of reading and assumes a two-fold responsibility in this regard:

   (a) Abundant free reading in the field of science should be made available. This is in addition to the regular secondary reference material.

   (b) In order to read with understanding a pupil must have an adequate knowledge of the vocabulary of science. Every science teacher should make certain that attention is given to teaching this vocabulary.

6. Science teaching is more stimulating and challenging when pupils are encouraged to work at first hand with the materials of science. **Experiments and demonstrations are an essential part of any science program.**

Perspective

To be more effective, a teacher of science must know how the work at hand fits into the total picture. Needless repetition of work covered previously by a class will be avoided by a teacher who is familiar with what has been taught in the preceding grades. Also, if a teacher knows what is to be offered to the class in succeeding grades, problems resulting from carrying a unit of study too far can be avoided.

Teachers should familiarize themselves with the science curriculum outline for each of the elementary, junior and senior high schools.

To help teachers obtain a proper overall picture of the science program summaries or "grids" for elementary, junior and senior high schools are included in this course outline. Staff meetings or consultations to familiarize teachers with the science programs at all levels are strongly recommended. It has been established that if these meetings are held early in the fall they will be of maximum value.

		GRADE I	GRADE II	GRADE III
LIVING THINGS	(a) Animals	**Environment,** homes, food, used by men for various purposes, prepare for winter.	**Must have food** to live and grow. Baby animals receive varying degrees of parental care.	**Have structures** that enables them to get food in many environments. Should be conserved by man.
	(b) Plants	**Live in various places,** are used by people and animals in various ways, prepare for winter.	**Need light and water** to grow. Seeds, travel in many ways.	**Have roots and leaves** to get food. **Have enemies** that can destroy them. **Are protected** by man.
	(c) Conservation	**Wild life**	**Forests** as **homes,** for animals. **Respect** for **birds' nests.** **Care of plants** by controlling insects, by wise use of water and general care.	**Care** of plants and animals as mentioned above.
THE EARTH AND THE UNIVERSE		**Weather—From day to day** Through the seasons.	**What We Can Learn From the Sky—** Directions. Moon changes. Kinds of clouds.	**The Earth We Live On—** Interesting geographic feature Rocks, soil and plants. Use of maps and globes.
		What we see in the sky— Sun, moon, stars, clouds.	**What Are the Causes of Weather—** Wet weather. Heat from the sun. Wind.	**Wonders in the Sky—** Sun, moon, stars.
		What we see on the earth around us— Rocks, land, water.	**Thermometer—** **Enrichment Material** How it works, what it tells us, and how it helps us.	**The Air Around Us—** Part of earth, found in soil and water, takes up space.
		Air is all around us— We can feel it. It moves things.	**Conservation—**Protection of toys from weather. Protection of soil against drifting.	**Conservation—**Water erosion and conservation of soil.
ENERGY AND MACHINES		**Machines—**Help us to do work easily and more quickly. Should be well cared for.	**Work—**Requires energy which comes from many sources.	**Wheels and Levers—** Use, operation.
		Magnets—Do strange things.	**Machines—**Use of rollers, wheels and ball bearings.	**Using Magnets and Electricity—** Poles, compass needle, dry cell, wires, light bulbs, switches.
			Fun With a Dry Cell— Suggested enrichment.	
			Rust—Suggested enrichment.	
		Conservation—Care of machinery.	**Conservation—**Protection of machines.	**Conservation—**Care of machinery.

ELEMENTARY SCHOOL SCIENCE

GRADE IV	GRADE V	GRADE VI
How Living Things are Grouped Living and non-living. Plants and animals. Seven groups of animals. Two groups of plants. **How Some Plants and Animals Make us Sick** Tiny plants and animals called germs. Some bacteria cause disease, others are helpful. Bacteria are everywhere and multiply very fast. **Why Do All Living Things Need Air and Water?** Animals and plants need oxygen to breathe. Plants use carbon dioxide to make food. Plants need water to dissolve food. Animals need water to make digestive juices and the liquid part of the blood. Conservation—Care of trees. Feeding birds in winter.	**Where Do New Plants and Animals Come From and How Do They Grow?** Mammals, birds, amphibians, etc. Plants grow from seeds, roots, stems, leaves, grafting, spores. Where Plants Grow—Enrichment suggestion. Conservation—Living Things. Forests.	**Interdependence of Living Things** Animals and animals. Plants and plants. Animals and plants. **What is the History of Living Things?** Earth long ago. Fossils. Plants and animals have changed. Importance of ability to adapt. **Fish Life**—Enrichment. Conservation—Wild Life. Soil.
The Earth—Its shape, spins on its axis, travels 'round sun. Has a blanket of air which is a mixture of gases, pressing on all things. Man uses this pressure. Has soil on its surface essential to plants and animals. Contains valuable rocks and minerals. Conservation Using Materials Wisely.	**What is the Universe Like?** Solar system, comets, eclipses, beyond the solar system, birth of our earth. **Changing the earth's surface.**	**Weather and How We Forecast It** Rain, Hail, Snow, Sleet, Wind. **The Milky Way and Beyond.** **Our Earth**—A huge Magnet. **The Earth's Airways and Beyond.** **Why The Seasons Change.** **Animals and Seasonal Changes.**
Static Electricity Charging objects, behavior of charged objects, lightning, thunder. **Current Electricity** Uses, current coming into homes, safety of using dry cells in experiments, conductors, insulators. **Our Body Is a Machine** Muscles move, bones and joints are levers, food provides energy. **Machines Help Man by Using Air Pressure** Electrical energy and energy from coal, petroleum, natural gas. Conservation Using Materials Wisely.	Electricity—Production and Control. Current electricity, frictional. How current flows. Why wires are covered. Production of heat, light, magnets, telegraph keys, electric bells. **Effect of Heat and Cold on Materials** Heat travels, effect of heat and cold on gases, liquids, solids. Heat and cold cause changes in gases, liquids and solids. **What Things are made of** Elements, compounds, molecules, chemical changes, facts about elements. **How We Control Fires** Materials to make fire, what happens when things burn, conserving fuels, preventing fires, putting out fires. Conservation—Prevention of Fire. Conservation of Heat.	**How Machines Can Fly** Man's observation of birds, insects, animals, seeds. Gliders, airplanes with motors, jet airplanes, safety in air travel. **How Machines Help Us To Do Work** Work, levers, inclined planes, pulleys, wheel and axle, making machines work better, safety around machines. **What is Sound and How Does it Travel?** Making sounds, how they travel, different sounds, controlling sounds, musical instruments, how our ears work. **What We Know About Light** Where it comes from, how it travels, how we see, mirror, lenses, how our eyes work, color in light, proper lighting. Conservation—Care of eyes and ears.

Junior High School Science

Grade VII

I. Plants, Fall Activities

1. Importance of plants
2. Parts of a plant
3. New varieties of plants
4. Wheat
5. Gardening
6. Flowers for the home and schoolroom
7. Common Alberta flowers
8. Plants and clothing

II. Earth's Crust

1. Age of the earth
2. Structure of the earth
3. Classification of rocks
4. The changing earth
5. Evidence of pre-historic life
6. Kinds of fossils
7. Geological eras, periods and epochs
8. Four Important Geological Eras

III. Soil and Erosion

1. Importance of soil
2. Composition of soil
3. Soil forming agencies
4. ✓ Water and air in the soil
5. Soil fertility
6. Soil erosion

IV. Water

1. Importance of water
2. The water cycle
3. Hard and soft water
4. Water purification
5. Conservation of water

V. Plants, Spring Activities

1. Trees and conservation
2. Seeds and germination
3. Gardening
4. Improvement of grounds
5. Plant enemies

Grade VIII

I. Animals

1. Comparing plants and animals
2. Invertebrates
3. Vertebrates
4. Necessity for conserving wildlife
5. Methods of conserving wildlife
6. Young people and conservation

II. Weather

1. Weather and climate
2. ✓ Air pressure and weather
3. Winds and weather
4. Water vapor and weather
5. Clouds and weather
6. Weather forecasting

III. The Solar System

1. Early ideas about the universe
2. Present ideas about the solar system
3. The sun
4. The earth
5. The moon
6. The planets
7. Astronomy and the stars
8. Smaller objects in the solar system
9. Stars of many kinds
10. Artificial satellites and looking to the future

IV. Magnetism and electricity

1. Magnetism
   - Natural and artificial magnets
   - Magnetic lines of force
   - The earth as a magnet
   - Everyday uses of permanent magnets
2. Static Electricity
   - Electrical charges
   - Electroscopes
   - Conductors and insulators
   - Control of static electricity
3. Electricity at rest and in motion
   - Magnetic fields and conductors
   - Electro-magnets and their uses
   - Sources of energy to produce electricity
   - Use of electricity for heat, light, communication and machines
4. Electricity in motion
   - Circuits
   - Batteries and cells
   - Generators and motors

V. Domestic Animals

1. Using and improving domestic animals
2. Cattle—Dairy and beef cattle
3. Livestock for power, fibre and food
   - Horses, sheep, swine, poultry and honey bees

Grade IX

The Grade IX science course will be on an experimental basis during 1959-60 and therefore subject to revision. For this reason the unit headings only are given in this outline.

Heat and Temperature

Machines
- Simple machines
- Machines at work

Light

Combustion and Fuels

SENIOR HIGH SCHOOL SCIENCE

Science 10

Since the new Science 10 course will not be available until September 1960, a transition outline for 1959-60 has been issued. The new outline will be available to all schools during the summer of 1960. Tentative plans call for the new Science 10 course to be as follows:

1. The Structure of Matter
2. Shorthand of Chemistry:
   - symbols and formulae
   - equations
3. The World's Most Abundant Element—Oxygen
4. Three Important Classes of Compounds:
   - A typical acid—HCl
   - A typical base—NaOH
   - A typical salt—NaCl
5. Mechanics of Fluids (elementary treatment)
6. Sound
7. Heat

Science 20

A. PHYSICS SECTION

1. Mechanics
   - Measurement
   - Density and Specific Gravity
   - Force, Work and Power
   - Buoyancy
2. Light
   - Nature and Propagation of Light
   - Photometry
   - Reflection of Light—Mirrors
   - Refraction of Light—Lenses
   - Color
   - Optical Instruments
   - Experiments on Light

B. CHEMISTRY SECTION

1. Solutions
2. Chemical Classification:
   - Law of Conservation of Mass
   - Law of Definite Proportion
   - Law of Constant Composition
   - Classification Table
   - Summary of Mixtures, Solutions, Compounds
3. The Gas Laws:
   - Reason for Pressure
   - Standard Pressure
   - Boyle's Law
   - Determining the coefficient of expansion of a gas
   - Absolute Temperature
   - Charles' Law
   - Standard Temperature
   - Combination of Boyle's and Charles's Laws
4. Laws and Theories
5. Symbols, Formulae and Equations
6. Valence
   - Valence and the electron theory
   - Meaning of valence
   - Elements with several valences
   - Table of valences
   - Using valence
7. Naming of Compounds
8. Using Equations

Experiments and Demonstrations

In any experiment there is a problem to be solved. Sometimes the problem may be to verify the results obtained by scientists, but there is still an element of discovery present because the outcome is not fully known beforehand. Some typical verification experiments are:

(a) finding the weight of a volume of air.

(b) determining the effect of like and unlike magnetic poles on one another.

Experiments that fail to verify known results should not be considered failures in the educational sense. Analysing the experiment and finding where it went wrong might develop the knowledge and thinking of a class as much as watching a successful verification.

As often as possible actual problems that exist should be solved by designing and carrying out pupils' experimental procedures. The problems to be answered might be of this type:

(a) Do soaked bean seeds germinate faster than dry bean seeds?

(b) Does rock specimen "A" contain limestone?

(c) Can brass be magnetized?

A demonstration differs from an experiment in that it is conducted by an "expert" who already knows what the outcome will be. The expert may be a teacher or a pupil, who under supervision, previously conducted the activity as an experiment. In the demonstration the expert is repeating the activity and attempting to lead others to the same conclusions reached in the original experiment.

Usually, a demonstration is conducted by one or more demonstrators in the presence of several observers. In an experiment small committees are usually working without spectators.

Experiments and demonstrations are not ends in themselves; their purpose is to encourage scientific thinking on the part of the class. Though the generalizations to be learned are prescribed, the experimental work leading to these may be flexible. Different experiments may be used from year to year and frequently a teacher should set groups working on different experiments, each leading to the same goal.

The recording of an experiment is a valuable experience for pupils but is of secondary importance. There should be rather complete notes on a few of the key experiments, but on minor experiments and demonstrations a brief note on each will suffice. The most important parts of an experiment are the planning, the observation and the critical thinking. Notes copied from a chalkboard or textbook on experiments that have never been performed are of no value to the pupils, regardless of how neat or well-colored the diagrams may be.

It has often been said, and rightly so, that a science course is not a science course unless there is experimentation and demonstration.

Enrichment

The purpose of enrichment in science is primarily to give pupils a better understanding of the generalizations. In other words, the concepts are being enriched.

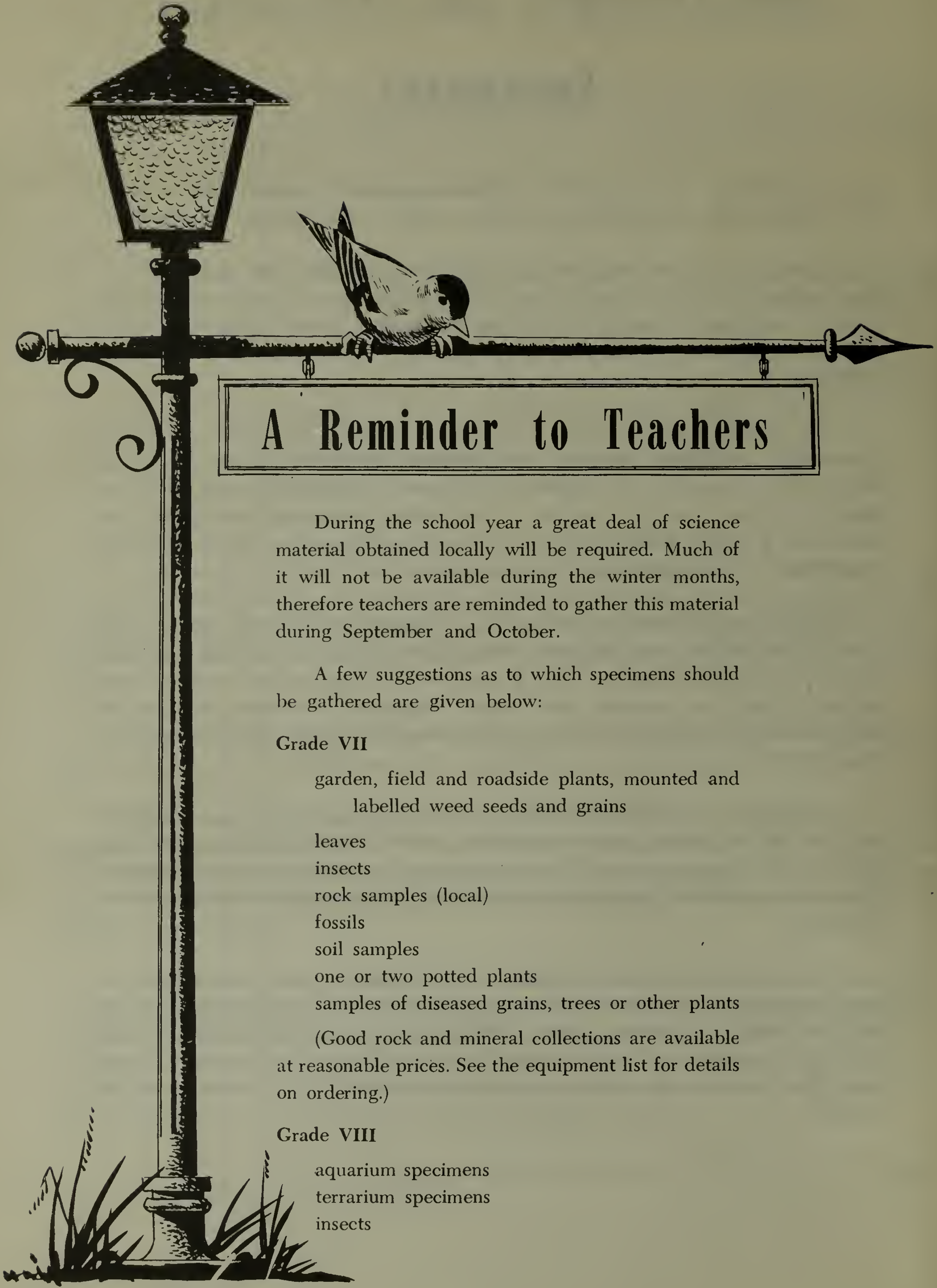
Enrichment can be carried out in two general ways. First, the pupils may be given material beyond the scope of the ordinary subject matter. This is usually termed "vertical" enrichment. Second, the pupils may be given additional experiences within the limits of the areas as outlined in the course. This may be referred to as "horizontal" enrichment.

The first method, actually a variation of acceleration, has definite drawbacks. At the time it may appear satisfactory but subsequent repetition may lead to obvious difficulty. This vertical type of enrichment may be used to advantage in areas that do not occur in a science course to be studied in later grades. In a case of this kind there is no reason why a teacher should not have a group of pupils go as far beyond the course requirements as time, pupil interest and ability permit.

The horizontal method of enrichment is usually the more desirable. Because much of the reading material must come from other than standard texts a teacher is required to become familiar with the science books in the library and also to gather together as much pertinent material as possible from current magazines. In addition, this type of enrichment calls for the fullest possible pupil participation in terms of experiments and demonstrations.

Enrichment is needed particularly by superior pupils who are not sufficiently challenged by the regular course requirements. However, there will be occasions when others of only average ability will become sufficiently interested to warrant enrichment. There is very little point in suggesting enrichment projects to pupils of low interest or low ability.

Finally it must be pointed out that enrichment exercises found in this guide are merely suggestive. They are intended for the teacher who has neither the time nor the specialized training in science to plan additional experiences for special students. The keen science teacher will think of many enrichment activities to supplement those listed. The real key to the selection of enrichment activities is the interest shown by the pupil.



A Reminder to Teachers

During the school year a great deal of science material obtained locally will be required. Much of it will not be available during the winter months, therefore teachers are reminded to gather this material during September and October.

A few suggestions as to which specimens should be gathered are given below:

Grade VII

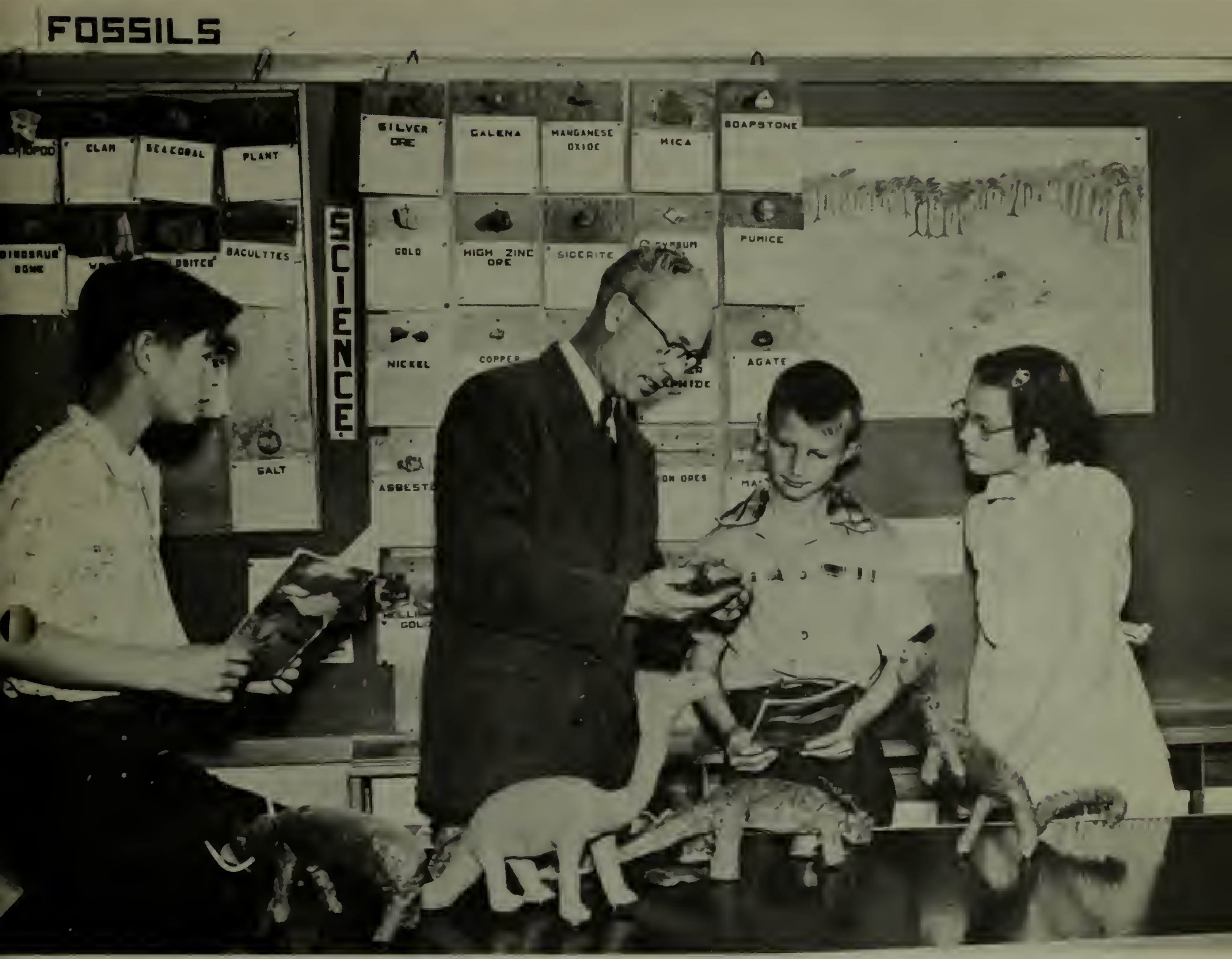
- garden, field and roadside plants, mounted and labelled weed seeds and grains
- leaves
- insects
- rock samples (local)
- fossils
- soil samples
- one or two potted plants
- samples of diseased grains, trees or other plants

(Good rock and mineral collections are available at reasonable prices. See the equipment list for details on ordering.)

Grade VIII

- aquarium specimens
- terrarium specimens
- insects

Grade Seven



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THE SCIENCE CLASS AT WORK

UNIT I — GRADE VII

PLANTS—FALL ACTIVITIES

References:

T. W. Hunt et al: *Science Activities, Book 1,* W. J. Gage

J. A. Partridge: *General Science, Book 1,* J. M. Dent

H. Bowers et al: *General Science, Book 3,* J. M. Dent

J. E. Adair et al: *Science, Discovery and Progress,* Clarke, Irwin & Co.

G. S. Craig et al: *Learning with Science,* Ginn & Co.

G. S. Craig et al: *Facing Tomorrow with Science,* Ginn & Co.

Suggested Additional References:

Grigg: *A New Course of Plants and Animals,* MacMillan

Basic Science Education Series:
The Plant World
Domesticated Plants

Filmstrips:

How Plants Live and Grow, P-7 (P.S.P.)

Parts of a Flowering Plant, Pk-2198 (Curriculum)

Flowers, Fruits and Seeds (S.V.E.)

How Flowering Plants Grow and Reproduce (S.V.E.)

Reproduction in the Plant Kingdom, P-1208 (D. Mail)

Pollination, P-3211 (Hulton)

Luther Burbank, Plant Wizard, Pk-2712 (E.G.H.)

Additional Visual Material:

Slide Sets:

Alberta Dicotyledonous Flowering Plants (2 x 2 Slide) Sk-7 (MacGregor)

Alberta Dicotyledonous Herbaceous Plants, SK-8 (MacGregor)

Alberta Simpler Plants—Spore Bearers, Sk-9 (MacGregor)

Alberta Plants — Monocotyledonous Flowering, Sk-10 (MacGregor)

Alberta Plants—Seed Dissemination by the Wind, Sk-11 (MacGregor)

Filmstrips:

How We Get Our Rayon, P-1531 (Y.A.F.)

How We Get Our Cotton, P-1432 (Y.A.F.)

How We Get Our Wool, P-1530 (Y.A.F.)

How We Get Our Sugar, P-1439 (Y.A.F.)

How We Get Our Rubber, P-2098 (Y.A.F.)

How We Get Our Plastics, P-1437 (Y.A.F.)

Apparatus:

- Several pieces of glass (approximately 3½" x 6")
- Several glass pans
- Several beakers—500 c.c.
- Test tubes
- Tincture of iodine
- Burners
- Retort stands
- Plant pots
- Thermometers
- Microscope

UNIT I

PLANTS—FALL ACTIVITIES

Content	Suggested Treatment
I. The Importance of Plants	Discuss the importance of plant life to all life.
A. Food	Make a chart of important food plants.
B. Shelter	Make a chart of plants used for shelter.
C. Clothing	Make a chart of plants used for clothing.
	Enrichment Suggestion: Plants vary in size.
II. The Parts of a Plant	
A. The Root	
1. Types of Roots	Make diagrams of different kinds of roots. Have students bring a root of each type for study.
2. Parts of a Root	Use a cross and lengthwise section of a carrot root to show these. Make a diagram labelling the parts. Make a pocket garden to observe root hairs. Experiment: to show how root hairs grow.
3. The Work of Roots	Discuss the purpose of roots and their parts. Experiment: Osmosis.
	Enrichment Suggestion: The parts of a plant differ.
B. The Stem	Discuss what happens to soil water that enters the root. Experiments to show the above: 1. Parsnip root 2. Twig or celery stalk 3. Leaf transpiration Make a diagram of a lengthwise section of a corn plant and of a tree as well as a cross-section diagram of each.
C. The Leaves	
1. Classes of Leaves a. Net-veined b. Parallel-veined	Make a collection of leaves. Make a diagram of the epidermis of a leaf to show the stomata.
2. How Leaves Manufacture Food	Show filmstrip. Discuss the raw materials obtained from the soil and from the air. Experiment: 1. To show the composition of sugar 2. To test for starch 3. To show light is essential for the manufacture of carbohydrates by plants 4. To test for protein Make a comparison between a leaf and a factory.

UNIT I

PLANTS—FALL ACTIVITIES

Aids and References	Understandings and Generalizations
Science Activities, Book 1, pp. 26-27 *General Science, Book 1,* p. 1 *General Science, Book 1,* pp. 5-7 *Science Discovery and Progress,* p. 488	All creatures depend on plants.
Learning with Science, pp. 114-116	
Science Activities, Book 1, pp. 28-29 *General Science, Book 1,* pp. 26, 28	
Science Activities, Book 1, pp. 30-32 *General Science, Book 1,* pp. 30, 31	
Science Activities, Book 1, pp. 32-35, 50 *General Science, Book 1,* pp. 29-32 *Science Discovery and Progress,* pp. 496-497	If a weak solution is separated from a stronger solution by a plant or animal membrane, there will be an exchange through the membrane, but more of the weaker solution will pass through than the stronger.
Learning with Science, pp. 117-120 *Unusual Things for Lively Youngsters* *Outdoor Things for Lively Youngsters*	
Science Activities, Book 1, pp. 36-40	Stems are part of a plant's transportation system.
General Science, Book 1, pp. 30, 36-38 *Science Discovery and Progress,* p. 498	
Science Activities, Book 1, pp. 39-40, 43	
General Science, Book 1, pp. 26, 28	
Filmstrip: *How Plants Live and Grow,* P-17 (P.S.P.)	
Science Activities, Book 1, pp. 41-46 *Science Discovery and Progress,* pp. 489-496 *Facing Tomorrow with Science,* pp. 8-12	Photosynthesis is the making of carbohydrates in green plants.

UNIT I

PLANTS — FALL ACTIVITIES

Content	Suggested Treatment
3. Storage of Food a. Annual b. Winter Annual c. Biennial d. Perennial	Discussion of annuals, winter annuals, biennials and perennials. List the advantages and disadvantages of each. **Enrichment Suggestion: The length of life of plants vary.**
D. The Flower	Show Filmstrip.
1. Parts of a Flower	Study several different flowers to show the parts. Make a diagram of a flower and label each part. Discuss the purpose of each part.
2. Pollination a. Cross b. Self	Show Filmstrip. Make a diagram to show cross-and self-pollination. List ways in which flowers are pollinated. Make a diagram in which flowers are pollinated. Make a diagram to show fertilization.
	Enrichment Suggestion: Flowerless plants.
III. New Varieties of Plants	
A. Selkirk Wheat	Discuss the development of Selkirk wheat.
B. Improved and New Varieties of Potatoes, Tomatoes and Corn	Discuss how potatoes, tomatoes and corn have been improved.
C. Work of Dr. Goulden and Luther Burbank	Reports on the work of Dr. Goulden and Luther Burbank. Show Filmstrip. **Enrichment Suggestion: A scientific classification of plants.**
IV. Wheat	
A. Importance	Discuss the importance of wheat.
B. Parts of Plant	Study a wheat plant and make a diagram labelling the parts.
C. Harvesting	Discuss changes in method of harvesting.
D. Grading	Report on the various grades of wheat.
E. Varieties	Collect samples of different varieties and grades of wheat.
	Enrichment Suggestion: The story of wheat.
V. Gardening	
A. Importance	Discuss the importance of gardens as a source of food.
B. Harvesting	Discuss why vegetables are harvested at different times. Visit the garden of an expert.
C. Storage of Vegetables	Discuss the importance of a proper storage room for vegetables. Make a storage chart.
D. Preparing a Garden for Winter	Report: How to Prepare a Garden for Winter.
VI. Flowers for the Home and Schoolroom	Show filmstrip.
A. Ways of Starting House Plants	Discuss various ways of starting house plants. Have the students start plants from slips or cuttings and bulbs at school.
B. Care of House Plants	List things to be done in caring for house plants.

UNIT I

PLANTS — FALL ACTIVITIES

Aids and References	Understandings and Generalizations
Science Activities, Book 1, pp. 47-48 *General Science, Book 1,* pp. 44-47	Food storage is related to reproduction.
Learning with Science, p. 127	
Filmstrip: *Parts of a Flowering Plant*	
Science Activities, Book 1, pp. 56-59 *General Science, Book 1,* pp. 48-49 *Science Discovery and Progress,* pp. 499-500	
Filmstrip: *Flowers, Fruit and Seed* (S.N.F.)	
Science Activities, Book 1, pp. 59-65 *General Science, Book 1,* pp. 49-50 *Science Discovery and Progress,* pp. 500-502 *Facing Tomorrow with Science,* pp. 14-16	Fertilization is necessary for seeds to form.
A New Course of Plants and Animals, pp. 15-41	
Science Activities, Book 1, pp. 65-70 *Science Activities, Book 1,* pp. 70-72 *General Science, Book 1,* pp. 17-18	New varieties of plants are being developed.
Science Activities, Book 1, pp. 72-75	
Filmstrip: *Luther Burbank, Plant Wizard*	
The Basic Science Education Series: *The Plant World*	
Science Activities, Book 1, pp. 76-84 *Science Discovery and Progress,* pp. 560-563	Wheat is one of our most important farm products.
Alberta Wheat Pool booklet, *The Story of Wheat*	
Science Activities, Book 1, pp. 90-94 *General Science, Book 3,* p. 367	Our garden provides us with a good supply of food.
Science Activities, Book 1, pp. 94-95 *General Science, Book 1,* p. 4	
Science Activities, Book 1, pp. 96-97	
Filmstrip: *How Plants Live and Grow* or *How Plants Grow and Reproduce*	
Science Activities, Book 1, pp. 98-107 *General Science, Book 1,* pp. 53-56 *General Science, Book 3,* pp. 400-404	Plants beautify the school and home.

UNIT I

PLANTS — FALL ACTIVITIES

Content	Suggested Treatment
VII. Common Alberta Flowers A. Recognition B. Seed Dispersal	Throughout the year mount common Alberta flowers. **Enrichment Suggestion: Domesticated plants.**
VIII. Plants and Clothing A. Importance of Proper Clothing	Discussion on importance of proper clothing. Experiment: Cooling effect of evaporation: 1. With cotton cloth. 2. Repeat, but fan. Experiment: Effect of sunlight on light and dark cloth.
B. Natural Fibres	List natural fibres. Discuss importance, advantages of each and from where each comes. Experiment: Test for wool. Experiment: Test for cotton.
C. Synthetic Fibres	Make a simple study of how rayon, nylon, orlon, glass, lanital, dacron (terylene), rubber and plastics are used and how they are made. Make a collection of various kinds of cloth. Make a chart showing synthetic fibres (uses). Experiment: Test pieces of various kinds of cloth to see which burns most readily.
D. Care of Clothing	Discuss how to clean clothes and how to protect clothes from moths. Experiment: To show the effect of soap on oil.

UNIT I

PLANTS — FALL ACTIVITIES

Aids and References	Understandings and Generalizations
Science Activities, Book 1, pp. 107-115	Seeds are scattered in many ways.
Basic Science Education Series: *Domesticated Plants*	
Science Activities, Book 1, pp. 118-123 *General Science, Book 1,* pp. 5-7	
Science Activities, Book 1, pp. 123-128	
Science Activities, Book 1, pp. 128-135	Synthetic fibres are replacing and supplementing natural fibres.
Science Activities, Book 1, pp. 136-137	Plants directly or indirectly provide us with clothing.

SUMMARY OF EXPERIMENTS FOR UNIT I

PLANTS – FALL ACTIVITIES

Experiment:

Problem: To show how root hairs grow.

Materials: Two pieces of glass 3½" by 6", several blotters, elastic bands, two or three bean seeds, a pan of water.

Method: Place the blotters and seeds between the two pieces of glass. Hold together with elastic bands. Place in the pan. Add water to the pan. Do not let all the water evaporate.

Observation: Watch the seeds start to germinate. Notice that the root develops before the shoot. As the root grows downward watch for the development of root hairs. Notice where the root hairs grow.

Conclusion: Root hairs grow on the root very thickly. They do not grow right at the end of the root.

Experiment:

Problem: What happens when a strong solution is separated from a weak solution by a plant membrane?

Materials: A large potato, some syrup, water, a beaker, and a knife.

Method: Cut the end off the potato. Hollow out the remainder. Add an inch of syrup to the hollow portion. Put water in the beaker. Stand the potato in the water. Let stand for several hours.

Observation: The level of the water outside the potato went down and the level of the syrup inside the potato went up.

Conclusion: The water passed through the potato skin into the syrup inside the potato. The process of osmosis was carried out.

Other osmosis experiments:

1. Soak dried prunes, raisins, or other dried fruit in water.
2. Soak dried beets, parsnips or other vegetables in water and in a strong salt solution. Notice the difference in the vegetables.
3. Break the shell of an egg, leaving the membrane unbroken. Place in a dish of water. Notice what happens to the water.

Experiment:

Problem: To show what happens to the soil water that enters the roots.

Materials: Two parsnip roots, beaker, water and red ink.

Method: Cut the lower ends of the parsnip roots (fresh from the garden). Let these stand in about ½" of diluted red ink for several hours. Cut a cross-section from one, and a lengthwise section from the other.

Observation: There were traces of red ink in the outer part of the central cylinder or vascular bundles.

Conclusion: Water travels through the vascular bundles up the root of the plant.

Experiment:

Problem: To show through what parts of the stem of a plant water travels.

Materials: Two freshly cut twigs of willow, diluted red ink and beaker.

Method: Put the diluted ink in the beaker. Then stand the two twigs in the beaker. Let stand for several hours. Cut a cross-section of one stem, and a lengthwise section of the other stem.

Observation: There were traces of red ink in the cambium layer.

Conclusion: Water travels through the cambium layer of a stem.

Other Experiments:

1. A corn stem could be used. Water travels through the vascular bundles.
2. A stalk of celery could be used for the above.

Experiment:

Problem: Does water escape from the leaves of plants?

Materials: A small-leafed plant, a small bottle, cotton batting, wire. Put a loop of stiff wire around the bottle, leaving a long end. Place the bottle so that a small branch with several leaves are enclosed in it. Plug the mouth of the bottle with cotton batting. Place the long end of the wire into the soil of the plant pot to support the bottle and thus prevent damage to the plant. Place the plant in a warm window for a few hours.

Observation: Drops of moisture form on the inside of the bottle.

Conclusion: Water escapes through the leaves of the plant (transpiration).

Experiment:

Problem: To show the composition of sugar.

Materials: Sugar, a test-tube and an alcohol lamp.

Method: Put a teaspoonful of sugar in the test-tube. Heat the sugar over an alcohol lamp.

Observation: Drops of water form on the sides of the test-tube. A black substance (carbon) remains in the test-tube.

Conclusion: Sugar is composed of carbon, hydrogen, and oxygen (Water consists of hydrogen and oxygen).

Other Experiments:

Taste will indicate the presence of sugar as in watermelon, sugar beets, tomatoes and other fruits.

Experiment:

Problem: To test for the presence of starch.

Materials: A piece of bread or potato and iodine.

Method: Put a drop of iodine on the bread or potato.

Observation: The bread or potato on contact with the iodine turned a dark blue or bluish black.

Conclusion: When iodine is put on something that contains starch, it turns a dark blue or bluish black.

Other Experiments:

Test any other foods that contain starch as well as several that do not contain starch.

Experiment: (Teacher Demonstrated)

Problem: Is light essential for the manufacture of carbohydrates by plants?

Materials: Two green plants, alcohol burner, alcohol, retort stand, two beakers, water, evaporating dish and iodine solution.

Method: Place one plant in bright sunlight and the other in the dark. After at least two days, cut a leaf from each plant and place in boiling water until well wilted. Mark the leaves. To remove the green chlorophyll from the leaves, place them in an evaporating dish partially filled with alcohol and heat. Keep the leaves in the hot alcohol ten to fifteen minutes or until they are almost white, then wash them in lukewarm water. Dip them into a solution of iodine for several minutes. Wash the leaves and examine them.

Observation: After being dipped in the iodine, the leaf that was left in the sunlight changed to a dark color, and the other leaf showed no change, indicating that no starch was present.

Conclusion: Light is essential for the manufacture of carbohydrates in plants.

Other Experiments:

1. Part of a leaf that has been exposed to sunlight, but contains no chlorophyll, could be tested as above.
2. Observe how plants grow when left in the same position in a sunny window.
3. Germinate seeds in the dark until seedlings develop. Observe color. Place in the light and observe the change.
4. Observe potato sprouts that have been in sunlight for several days.
5. Observe the effect on grass when it is covered by a board.

Experiment:

Problem: To test for the presence of protein.

Materials: Lean meat, wool, fur and feathers.

Method: Burn these to observe odor.

Observation: A definite offensive smell was quite noticeable.

Conclusion: Proteins when burned give off an offensive odor.

Other Experiments:
Burn various substances such as beans, wheat, etc., to see which give off the same offensive odor.
Experiments on different ways of starting plants can be carried out but require considerable time to see results:

1. Start plants from a stem cutting in water to form roots, then transplant.
2. Start plants from a stem cutting in sand to form roots, then transplant.
3. Start plants from a stem cutting in vermiculite to form roots, then transplant.
4. Start plants from a leaf cutting in water to form roots, then transplant.
5. Start plants from a leaf cutting in sand to form roots, then transplant.
6. Start plants from a leaf cutting in vermiculite to form roots.
7. Start plants from bulbs in soil.
8. Start plants from bulbs in water.

Experiment:
Problem: To test the cooling effect of evaporation.
Materials: Water, beaker, thermometer, piece of cotton cloth.
Method: Let water stand in a beaker until it reaches room temperature. Use the thermometer to check the temperature of the room and of the water. Record this temperature. Tie a small piece of cotton around the thermometer bulb and dip it in the water. Remove the thermometer from the water, hold it for a minute or two, and record the temperature.
Observation: The temperature was lower on the second reading.
Conclusion: The water, in evaporating from the cloth, took some of the heat from the liquid in the thermometer, causing the lower reading.

Experiment:
As above but fan the thermometer before taking the second reading.

Experiment:
Problem: Do light and dark colored cloths absorb equal amounts of heat from the sun?
Materials: Two thermometers, two beakers, white cloth and dark cloth.
Method: Cover one thermometer with white cloth and the other with dark cloth of the same material and size. Place in a beaker and let stand in a sunny window for a few minutes. Record the readings at the beginning of the experiment and again after several minutes.
Observation: The thermometer wrapped in the dark cloth had the higher reading.
Conclusion: Dark cloth absorbs more heat from the sun than light cloth.

Other Experiments:

1. Test wool to see if it contains protein.
2. Test several different pieces of cloth to see if they contain wool.

Experiment:
Problem: To show a test for cotton.
Materials: Cotton, match.
Method: Burn a small amount of cotton.
Observation: A fine gray ash was left. There was no protein odor.
Conclusion: When cotton burns there is no protein odor and a fine gray ash remains.

Experiment:
Problem: To show which kind of cloth burns most readily.
Materials: Rayon, silk, wool, cotton, linen, a pair of tongs, matches.
Method: Using the tongs to hold the materials, burn each one separately.
Observation: Rayon burned fastest, followed by silk, wool, cotton, and finally linen.
Conclusion: Rayon burns most readily, linen least readily.

Other Experiments:
Test other materials and synthetic fibres in the same way.

Experiment:

Problem: To show the effect of soap on oil.

Materials: Bottle, water, oil, soap flakes or liquid soap.

Method: Pour a few drops of oil into a bottle of water. Shake vigorously. Let stand for a few minutes. Observe what happens to the oil. Then add a few soap flakes or some liquid soap. Shake vigorously. Let stand for a few minutes. Observe what happens to the oil.

Observation: Before soap was added, the oil came to the top of the water. After adding soap, the oil broke into small particles and mingled with the water.

Conclusion: The soap broke the oil into small droplets that mixed with the water.

References for other Experiments (Fall Activities)

1. Do roots take water? Exp. 2-3, page 30, General Science, Book 1.
2. What parts of the roots are especially adapted to take in water and dissolved materials from the soil? Exp. 2-4, page 30, General Science, Book 1.
3. How are root hairs fitted to absorb moisture? Exp. 2-5, page 31, General Science, Book 1.
4. How are water and dissolved mineral substances carried from the roots to the leaves? Experiment 2-7, page 32, General Science, Book 1.
5. How efficiently was the red ink distributed throughout the leaves? Exp. 2-8, page 33, General Science, Book 1.
6. Observe how a carrot begins growth a second time (biennial). Exp. 3-6, page 44, General Science, Book 1.
7. Osmosis Exp., page 496, Science: Discovery and Progress.
8. Soil water contains dissolved minerals. Exp., page 497, Science: Discovery and Progress.
9. Transpiration Exp., page 498, Science: Discovery and Progress.
10. To show a cross-section of a leaf. Exp., page 492, Science: Discovery and Progress.
11. To show a plant cell. Exp., page 490, Science: Discovery and Progress.
12. To show that starch contains oxygen, hydrogen and carbon. Exp., page 493, Science: Discovery and Progress.
13. Do plants give off oxygen in sunlight? Exp., page 495, Science: Discovery and Progress.

UNIT II—GRADE VII

THE EARTH'S CRUST

References:

T. W. Hunt et al: *Science Activities, Book 1,* W. J. Gage

J. A. Partridge: *General Science, Book 1,* J. M. Dent

G. S. Craig et al: *Facing Tomorrow with Science,* Ginn & Co.

Smith, Jones: *Exploring Modern Science,* Lippincott Co.

Life Magazine: *The World We Live In,* Musson Book Co.

Basic Science Education Series—Row Peterson

Stories Read from the Rocks

Earth's Changing Surface

Animals of Yesterday

Reptiles

Smith, Jones: *Enjoying Modern Science,* Lippincott Co.

S. N. Narnowitz: *Earth Science, Book 1,* Van Nostram & Co.

Hogg et al: *Physical Sciences,* Van Nostrand Co.

Suggested Additional References:

Frost: *Prehistoric Animals,* Maxton Press, available Jack Hood Supplies, Stratford

W. E. Swinton: *Corridor of Life,* Clarke, Irwin

Schuchert: *Outlines of Historical Geology,* John Wiley & Sons, New York

Minerals, Golden Book

Limpus et al: *Uses of Science,* Macmillan

Book of Popular Science, Grolier

F. Watts: *First Book of Prehistoric Animals,* Grolier Society

Beauchamp: *Science Problems,* Scott, Foresman et al

Filmstrips:

Our Changing Earth, Curriculum, Pk-2195

The World We Live In (a series), Life Magazine

The Earth is Born, Life Magazine, Pk-2028

About Our Earth, Curriculum, Pk-2193

Discovering Fossils, E.B.F., Pk-3038

Story Fossils Tell, E.B.F., Pk-3037

The Story of the Earth We find in Rocks, J. Handy, P-261

Dinosaurs, N.F.B., P-1597

Reptiles Inherit the Earth, Life Magazine, Pk-2142

Prehistoric Monsters, B.I.F., P-1544

The Age of Mammals, Life Magazine, Pk-2117

Additional Filmstrips:

The Earth's Crust, P-2112 (Hulton)

Geology: Study of the Earth and Forces Acting On It, P-2917 (Ohio State)

The Formation of Coal, P-1511 (Unicorn Ltd.)

Hawaiian Islands: Volcanic Origin and Growth, P-3089 (Dowling)

How We Think Our Earth Came to Be, P-258 (J. Handy)

The Earth is Changing, P-259 (J. Handy)

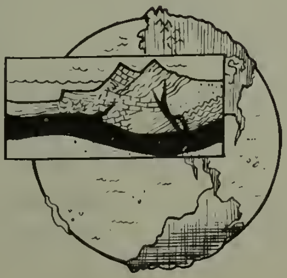
How Rocks Are Formed, P-260 (J. Handy)

Story of Mountains, Pk-2744 (E.B.F.)

Story of Volcanoes, Pk-2746 (E.B.F.)

Surface of the Earth, Pk-2810 (Y.A.F.)

Animals of Long Ago, Pk-2197 (Curriculum)



UNIT II

THE EARTH'S CRUST

Content	Suggested Treatment
I. Age of the Earth	Discuss methods of estimating the age of the earth. 1. Amount of salt in the ocean. 2. Time needed to erode mountain ranges. 3. Rate of formation of sedimentary rocks. 4. Radioactive material in the rocks.
II. The Structure of the Earth A. The Four Layers	Show filmstrip. A short treatment of the four layers. Make a diagram of the cross section of the globe.
B. The Crust	Discuss the importance of oil-well drilling by giving an idea of what is within the crust.
C. The Interior	(Try to obtain a piece of core from well-drilling firm.) Report on volcanoes, geysers and hot springs. Make a diagram of a volcano. Discuss the relationship between depth and temperature. **Enrichment Suggestions: Use of radioactive carbon-14 in determining the age of organic material.** **Theories of how the earth came into existence.**
III. Classification of Rocks	Make a collection of as many different rocks as you can.
A. Igneous Rocks	Discuss: Lava Granite
B. Sedimentary Rocks	Discuss: Shale Sandstone Conglomerate Limestone Lignite Experiment: Why do sedimentary rocks form in layers?
C. Metamorphic Rocks	Discuss: Marble Slate Quartzite Gneiss Schist Anthracite Experiment: Show the effect of acid on limestone. **Enrichment Suggestions: Size of crystals depends on rate of cooling.** **Make a collection of minerals.**

UNIT II

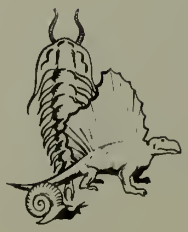
THE EARTH'S CRUST

Aids and References	Understandings and Generalizations
Science Activities, Book 1, pp. 143-148 *Book of Popular Science, Book 1,* p. 198	The earth's ancient history is written in the rocks. Scientists now believe that the earth has existed as a planet for at least five billion years.
Filmstrip: *Our Changing Earth* *Science Activities, Book 1,* p. 145 *General Science, Book 1,* pp. 202-203 *Popular Science, Book 1,* pp. 313-314	Geologists have learned a great deal about the interior of the earth, e.g. 1. The interior of the earth is hot. 2. The materials within the earth are under great pressure. 3. The earth consists of four layers or spheres.
Facing Tomorrow with Science, pp. 196-201 *Exploring Modern Science,* pp. 102-105 *Book of Popular Science, Book 4,* pp. 1315-1317 *The World We Live In*	
Science Activities, Book 1, pp. 149, 158 *Stories From the Rocks,* pp. 22-25	There are many kinds of rock present in the earth's crust. Rocks are classified according to how they were formed.
Science Problems (2), pp. 136-141, 166-169	Each kind of rock is composed of one or more minerals; and in its turn each mineral is composed of one or more elements. Elements present in rocks are of great importance to us.
Facing Tomorrow With Science, pp. 212-221 *General Science, Book 1,* pp. 209-216 The Geology Department, University of Alberta, will assist in classifying school collections. Mail small samples (about the size of walnuts), number the samples and include a tally sheet. *Minerals,* Golden Book	

UNIT II

THE EARTH'S CRUST

Content	Suggested Treatment
IV. The Changing Earth	Show filmstrips:
A. The Destruction of Land Masses	Discuss the two essential processes: 1. Rock erosion and soil building. 2. Mountain building. Mention each of the agents of rock erosion: Wind, waves, rivers, glaciers, etc. (This will be dealt with in detail in Unit III, Soil and Erosion.)
B. The Building of Land Masses	Deal with the movement of the earth's crust: folding of the earth's crust (anticline and syncline), faulting, earthquakes. Study hot springs, volcanoes and geysers. **Enrichment Suggestions: Study the seismograph and its use. Look for the causes of volcanoes—list world's famous volcanoes.** **Cause of hot springs.**
V. Evidence of Pre-Historic Life Found in the Rocks of the Earth	Review, from Chapter 5, Science Activities, how sedimentary rocks are formed. Discuss how remains and evidence of living things could be trapped and preserved in the sedimentary rocks. Arrive at a satisfactory definition of "fossils".
VI. Kinds of Fossils A. Actual remains B. Petrified remains C. Moulds, casts and prints D. Fossil footprints	Show that there are four chief fossil types. Study fossil collections, if available. Make a school collection of fossils. A little enquiry should reveal fossils that have been found locally. Show filmstrips. Make a plaster of Paris cast of a shell.
VII. Geological Eras, Periods and Epochs	Discuss the eras as a group: Pre-Cambrian— Archeozoic Proterozoic Paleozoic Mesozoic Cenozoic Discuss what types of changes were needed to introduce a new era, e.g. changes in climate, mountain building, continental uplift or submergence, changes in life.
VIII. Four Important Geological Eras	
A. The Pre-Cambrian Era	Discuss briefly the limited evidence of life in the Archeozoic and Proterozoic eras.
B. The Paleozoic Era	Study and discuss the periods and the dominant life forms of the Paleozoic era, giving emphasis to trilobites, shellfish, fish, amphibians, insects and early reptiles. Emphasize the importance of the Devonian period to Alberta. Study a map of Alberta showing the oil fields.



UNIT II

THE EARTH'S CRUST

Aids and References	Understandings and Generalizations
Filmstrip: *Our Changing Earth, About Our Earth*	
The Earth's Changing Surface, pp. 13-18, 31-34	
Science Activities, Book 1, pp. 159-171	
Facing Tomorrow with Science, pp. 196-212	
Science, Discovery and Progress: pp. 463 and 602	
The Earth's Changing Surface, pp. 26-31 *Enjoying Modern Science,* pp. 212-223 *Book of Popular Science, Book 3,* pp. 1141-1154 *Uses of Science:* pp. 250-252	Vast forces are at work to change the earth's surface.
Earth Science, Book 1, pp. 50-52	Mountains and land masses are still being built up and worn away.
Science Activities, Book 1, pp. 152-154, 178-185	Life has been present on the earth for millions of years.
Physical Sciences, pp. 105, 107	
The World We Live In, p. 89	
Science Activities, Book 1, pp. 179-183	Fossils show evidence of change in life forms which have occurred through the ages.
Filmstrip: *Discovering Fossils* or *The Story Fossils Tell* or *The Story of the Earth We Find in Rocks*	
Earth Science, Book 1, pp. 266-274	Each era represents the time span between successive major geographical changes. These geographical changes were accompanied by corresponding changes in life. Periods and epochs represent main changes within the eras.
Science Activities, Book 1, pp. 186-212	Life in Pre-Cambrian times was of a very low form that left few fossils.
Physical Sciences, pp. 107-115	
The World We Live In, pp. 93-122	
Stories Read from the Rocks, pp. 1-14	Alberta's oil and the coal mined in eastern North America were formed during this era. Oil and gas have been found in areas scattered throughout much of Alberta.
See Calgary Power booklet, *Alberta—Land of Opportunity,* p. 31 (If not available write to Curriculum Branch, Department of Education for oil map. Teachers only should write.)	

UNIT II

THE EARTH'S CRUST

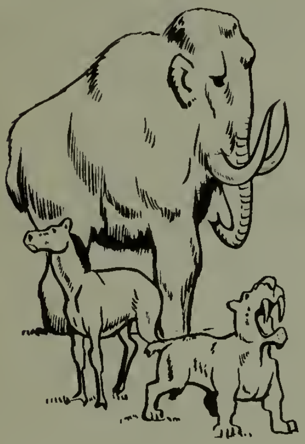
Content	Suggested Treatment
C. The Mesozoic Era	Study and discuss the periods of the Mesozoic era with special emphasis on the Cretaceous in Alberta. Discuss the development of life, giving special emphasis to reptiles and their rise and decline, plant life, insects and early mammals. Show filmstrip. Make a visit to a museum displaying dinosaur bones if possible.
D. The Cenozoic Era	Study and discuss briefly the Cenozoic era with reference to: (a) mammals (b) the ice age (c) early man
IX. Summary	Construct a time scale from the early Paleozoic era to the present (1": 2,000,000 years). Compare with period of earth's existence.

Enrichment Suggestions:

1. **Make a study of a particular type of life, e.g. the development of the modern horse, or other domesticated animal; dinosaurs, elephant, man, etc.**
2. **Make a study of maps showing North America in such periods as the Devonian and the Cretaceous. Note how there were times when most of the present land was submerged.**
3. **Study in some detail the periods of the Paleozoic and Mesozoic.**
4. **Index fossils.**

UNIT II

THE EARTH'S CRUST

Aids and References	Understandings and Generalizations
Animals of Yesterday, pp. 1-37 *Reptiles,* pp. 34-35 Filmstrip: *Dinosaurs or Reptiles Inherit the Earth* or *Prehistoric Monsters.*	The Mesozoic era was dominated by reptiles, of which the dinosaurs were the most spectacular.
Earth Science, Book 1, pp. 267, 101-103 	Mammals were the dominant form of life during this era. Glaciation was widespread. Man is a very recent addition to the scene. Geography, climate and life have changed throughout the ages. With respect to life, there has been a gradual development from the simple to the more highly organized. Life has been present for a relatively short period in the earth's long history.
Prehistoric Animals *The World We Live In* *The Corridor of Life* *Compton's Encyclopaedia* *World Book* *Britannica Junior*—refer to topics such as: geology, fossils, animals—prehistoric, etc. *Outlines of Historical Geology—* *The First Book of Prehistoric Animals* *Earth Science, Book 1,* p. 271	

SUMMARY OF EXPERIMENTS FOR UNIT II

THE EARTH'S CRUST

Experiment: Why do sedimentary rocks form in layers? Science Activities, Book 1, page 218.

Experiment: What is a test for limestone? Science Activities, Book 1, page 155.

Experiment:

Problem: To show how a fossil imprint may remain after the original organic matter has been destroyed.

Material: A handful of soft clay.
Leaf, at least one inch long.

Method: Place the leaf on a flat surface and press the clay upon it firmly. Lift the clay with the leaf stuck to it, and press more clay on the other side, thus enclosing the leaf in the clay. Place the clay on a screen and heat until the clay dries and becomes hot enough to char the leaf.

Break the clay block and find the remains of the leaf.

Observation: Find what is left of the leaf.
Observe the detailed print that remains.

Conclusion: A fossil imprint may be preserved after the original material, such as a leaf, has been entirely altered or destroyed.

UNIT III – GRADE VII

SOIL AND EROSION

Reference:

T. W. Hunt et al: *Science Activities, Book 1*

Map, *Soil Zones of Alberta* (Curriculum Branch)

J. A. Partridge: *General Science, Books 1 and 3,* Dent

G. S. Craig et al: *Learning with Science,* Ginn & Co.

J. E. Adair et al: *Science, Discovery and Progress,* Clarke, Irwin and Co.

Smith et al: *Exploring Modern Science,* Lippincott

Suggested Additional References:

Minerals: Golden Books

Teacher's Reference:

S. M. Namowitz: *Earth Science, Book 1,* Van Nostrand Company

Filmstrips:

Story of Air (erosion), Pk-2743 (E.B.F.)
Conserving our Soil Resources, Pk-2451 (Curriculum)
The Soil, P-262 (J. Handy)
Story of Glaciers, Pk-2745 (E.B.F.)
The Face of the Land, Pk-2030 (Life)
Our Changing Earth, Pk-2195 (Curriculum)
Work of Rivers, P-2107 (Hulton)
Work of Ice, P-2108 (Hulton)
Animal Life and the Soil, P-1538 (E.B.F.)
Plant Life and the Soil, P-1536 (E.B.F.)
How Soil is Formed, P-1535 (E.B.F.)
How Long Will It Last? P-1534 (E.B.F.)
Water and the Soil, P-1537 (E.B.F.)
How Man Has Used the Soil, P-1540 (E.B.F.)
How Man Conserves the Soil, P-1541 (E.B.F.)
Saving the Soil, Pk-1285 (P.S.P.)
The work of Weather, P-2109 (Hulton)

Laboratory Apparatus:

Cans or bottles
Vinegar
Burners
Beakers
Retort stands
Funnels
Filter paper
Capillary tubes
Glass plates (3½" x 6")
Thistle funnel
Membranes
Fertilizer samples and labels

UNIT III

SOIL AND EROSION

Content	Suggested Treatment
I. The Importance of Soil	Discussion of the importance of soil.
II. Composition of Soils A. Sand B. Silt C. Clay D. Humus	Examination of soil samples under a magnifying glass to identify constituents. Experiment: Breaking up a soil sample into constituents by settling action in water. (Performed in Unit II). Experiment: Removal of humus by burning.
III. Soils are Classified as: A. Sand B. Clay C. Loam D. Peat	Make a labelled collection of soils. Map and discuss soil zones in Alberta. Relate each to crop production.
IV. Subsoils A. Types B. Importance	Examination of a cut bank, soil profile or excavation, to note topsoil and subsoil. Collect samples of subsoil or profiles to show—clay subsoil, sandy subsoil and gravel subsoil. Discussion and summary: importance of subsoil in crop production. **Enrichment Suggestions: Observation of structures of soil particles under magnification.** **Construction of local soil profiles showing topsoil and subsoil.** **Report: "How the topsoil affects the nature and kind of crops grown on it."**
V. Soil-forming Agencies A. Water B. Temperature Change C. Glaciers D. Wind E. Plants F. Animals	Experiment: To show that water expands in freezing and exerts pressure. Experiment: To show a weak acid solution will attack limestone. (Performed in Unit II). Experiment: To show the effect of heating and cooling rocks quickly. Activities of glaciers—reading and observation of rocks. Examination of stones covered by mosses or lichens for chemical action. Examination of cement sidewalks or rocks broken by roots. Examination of earthworm activities. Discussion and summary of soil formation. Collection of specimens showing action of various agents. Discussion of origin of organic matter in soil. **Enrichment Suggestions: Determine the amount of expansion of water in freezing.** **Stalagmites and stalactites.** **World famous limestone caves.** **Reversing reactions in tests for CO_2.** **Reports on Columbia Icefields, Angel Glacier, etc.** **Local evidence of glaciers.** **The nitrogen cycle.**

UNIT III

SOIL AND EROSION

Aids and References	Understandings and Generalizations
	Good topsoil is our most important natural resource.
Science Activities, Book 1, pp. 216-218	Good soil is a mixture of several constituents.
Science Activities, Book 1, p. 218 Map—*Soil Zones of Alberta* (this map is available from: Curriculum Branch, Department of Education, Edmonton. Teachers only should write.) *General Science, Book 1,* pp. 323-324 *General Science, Book 3,* pp. 324, 327	Character of the soil helps determine crops grown.
Science Activities, Book 1, pp. 219-220 *General Science, Book 1,* p. 325	Character of the subsoil is also important.
Minerals: Golden Books	
Science Activities, Book 1, pp. 221-228	
General Science, Book 1, pp. 320-323 *Science, Discovery and Progress,* pp. 466-471	
Learning with Science, pp. 36-81	Many agents of erosion are active in soil making.
Exploring Modern Science, pp. 109-124	
Teacher's Reference—*Earth Science, Book 1,* Chapter 5-9	

UNIT III

SOIL AND EROSION

Content	Suggested Treatment
VI. Water in the Soil A. Importance as a Solvent B. Movement C. Retention D. Conservation	Review osmosis and transpiration from Section 1. Experiment: Dissolving minerals out of the soil, using water. Discussion: Why ample water supply is necessary for plant growth. Experiment: To show rise of water in soils. Experiment: To show water-holding ability of soils. Discussion and Summary: Methods of conserving moisture. Use of peat, sacks, etc. for moisture conservation in lawn building.
VII. Air in the Soil	Experiment: Check good garden soil for presence of air. Discussion and summary: Necessity for air in soil. **Enrichment Suggestions: Leaching in Soils. Factors which affect capillarity.**
VIII. Soil Fertility A. Essential Minerals B. Bacteria and Inoculation C. Loss of Soil Fertility D. Restoring Soil Fertility 1. Use of legumes 2. Crop rotations prolong soil life 3. Barnyard manure and green manures 4. Commercial fertilizers 	Reading and research—minerals necessary for plant growth. Grow plants in sand, using different types of fertilizer and no fertilizer. (Check directions carefully to avoid burning with too strong solution.) Reading research: Work of soil bacteria. How soil fertility may be lost. Collecting and listing legume plants grown in area. Examination of roots to note nodules. Discussion: Part played by nodules in fixing nitrogen. Use of crop rotations to build up soil. Discussion: Livestock and soil fertility, green manures, compost heaps. Use of commercial fertilizers in plant growth. **Enrichment Suggestions: Comparison of solubility of common salts. Effect of "soil mining" in the U.S.A. and Canada.** **How soils are analysed.** **Local crop rotations—Check with local farmers or D.A. to find use and purpose.** **Hydroponics. Sources of commercial fertilizer. Numbering system of fertilizers.**
IX. Soil Erosion A. Wind Erosion 1. Causes 2. Remedies B. Water Erosion 1. Causes 2. Remedies C. Soil Conservation and Government Programs	Collection: Pictures of wind- and water-eroded soil. Discussion: Conditions which cause erosion. Diagrams, pictures, paragraphing. "How Wind and Water Erosion may be Controlled." Experiment: Use of contour ploughing and sodding to control erosion. Investigation, research and report: 1. Activities of P.F.R.A. in Western Canada. 2. River Valley Authority in Ontario. **Enrichment Suggestions: Government action in soil conservation in U.S.A.—Tennessee Valley Authority, etc.**

UNIT III

SOIL AND EROSION

Aids and References	Understandings and Generalizations
Science Activities, Book 1, pp. 32-33	
Science Activities, Book 1, pp. 228-234	Water is essential to plant growth.
General Science, Book 3, pp. 329-550 *General Science, Book 1,* pp. 327-379 *Science, Discovery and Progress,* pp. 477-480	
	Air is necessary in the soil for seed germination and growth.
Science Activities, Book 1, pp. 235-243 *Science, Discovery and Progress,* pp. 474-477 *General Science, Book 1,* pp. 332-334, 357-362	Minerals are essential to plant growth.
General Science, Book 3, pp. 331-336	Bacteria are important to the growth of some plants.
	Soil minerals may easily become depleted and therefore must be used carefully and replaced when used.
See material on soil in *Classroom Aids for Teachers,* 258, 259, 299, 300, 301, 302, 383, 415	
Science Activities, Book 1, pp. 243-254 *Earth Science, Chapter 15,* pp. 174-188 *General Science, Book 1,* pp. 363-379	A major problem in all countries is the prevention and control of soil erosion.
See *Classroom Aids for Teachers*	

SUMMARY OF EXPERIMENTS FOR UNIT III

SOIL AND EROSION

Experiment: Removal of humus by burning.
Science Activities, Book 1, page 218.

Experiment: To show that water expands when freezing.
Science Activities, Book 1, pages 221-2.

Experiment: The effect of heating and rapid cooling of rock.
Science Activities, Book 1, page 223.

Experiment:

Problem: To discover whether or not minerals may be dissolved out of soil.

Apparatus: Soil, beakers, water, funnel, filter paper, retort stand and wire gauze.

Procedure: Half fill a beaker with soil.
Add a quarter beaker of water, stir thoroughly and heat.
Allow to settle.
Decant off water from top of beaker and filter into another beaker.
Heat until the water has boiled off.

Observation: Note solid residue left in evaporating dish.

Conclusion: Minerals dissolve readily out of soil.

Experiment: Rise of water in soils.
Science Activities, Book 1, page 229.

Experiment: Water-holding ability of soils.
Science Activities, Book 1, pages 230-31.

Experiment: Air in garden soil.
Science Activities, Book 1, pages 233-4.

Experiment: Contour ploughing to control erosion.
Science Activities, Book 1, page 247.

UNIT IV—GRADE VII

WATER

References:

Hunt et al: *Science Activities, Book 1,* W. J. Gage & Co.

J. A. Partridge: *General Science, Book 1,* Dent & Sons

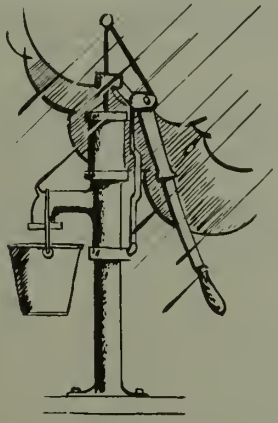
H. Bowers et al: *General Science, Book 3,* Dent & Sons

Adair et al: *Science, Discovery and Progress,*
Clarke, Irwin Co.

Clark et al: *Science on the March,*
Unit 2, *Water and Life,* Longmans, Green

Filmstrips:

Water (Ryerson Film Service), P-324
The Beaver (National Film Board), P-1811
Water and the Soil, P-1537 (E.B.F.)
Water Cycle, P-2725 (Dowling)
Story of Underground Water, P-2742 (E.B.F.)
Ground Water, P-295 (S.V.E.)
Conserving Our Water Resources, Pk-2454 (Curriculum)
Conserving Water and Soil, P-3088 (Dowling)
The Water We Drink, Pk-2822 (E.B.F.)



Laboratory Apparatus:

- Balance scales
- Beakers
- Retort Stand
- Alcohol burner
- Funnel
- Filter paper
- Florence flask
- Test tubes
- Rubber stoppers
- Rubber tubing
- Glass tubing
- File
- Eye dropper
- Microscope
- Flower pot (large)

UNIT IV

WATER

Content	Suggested Treatment
I. The Importance of Water	
A. Sources	Discussion of sources of water.
B. Forms	Discussion of three forms.
C. Domestic Uses	Reading and Research: *How We Use Water in our Home.*
	Experiment: To determine if there is water in food.
	Show filmstrip.
D. For Farming	Discussion on the need for water on a farm, and the amounts plants and animals require.
	Experiment: Does water dissolve substances?
	Discuss how water is stored on farms.
E. Industrial Uses	Collect pictures of how water is used in industry. Discuss this topic.
F. Commercial Uses	Discuss importance of water in transportation and fishing.
G. Recreational Uses	Paragraph: How we make use of water for recreational purposes. Collect pictures of these.
II. The Water Cycle	
A. What causes water vapor to condense	Experiment: Can water vapor in the air be condensed?
B. What is the water cycle	Discuss the water cycle, and its importance. Make a diagram to show the water cycle.
C. Making use of the water cycle	Experiment: Can you filter or strain salt out of water?
	Experiment: Can you remove the salt from water by settling?
	Experiment: To change salt water to drinking water.
D. Hard and soft water	Discussion of hard and soft water.
	Experiment: To test the scale on boiler pipes or kettle for limestone.
	Experiment: Why is soft water used for washing?
	Experiment: How can hard water be softened?
	Enrichment Suggestion: What causes rain, hail and snow?
	Uses of distilled water.

UNIT IV

WATER

Aids and References	Understandings and Generalizations
Science Activities, Book 1, pp. 260-267	
General Science, Book 1, pp. 73-104	
Science Discovery and Progress, pp. 179-193	
Science on the March, Unit 2, pp. 5-10	
Filmstrip: *Water*	
	Water is an important part of all living things.
	Water plays an important part in many of our activities.
Science Activities, Book 1, pp. 268-274	
General Science, Book 1, pp. 99-101, 104-108	
Science, Discovery and Progress, pp. 154-155, 168-170	
General Science, Book 3, pp. 17-23, 33-34	The water cycle is necessary to life.
Science on the March, Unit 2, pp. 12-17, 22	
Learning with Science, pp. 99-100	

UNIT IV

WATER

Content	Suggested Treatment
III. Water Purification	
A. Sources of supply	Discussion of sources of water for Alberta cities, towns, villages, and farms. Make a map of Alberta showing rivers and lakes that provide water for these.
B. The siphon	Experiment: To show how a siphon aids in getting a water supply.
C. How water is purified	Experiment: Does pond water contain living organisms?
	Discuss how impurities get into water.
	Define pure water.
	Experiment: To show that settling removes some solid particles from water.
	Experiment: To show that filtering removes solid particles from water.
	Discussion: Use of chlorine to destroy bacteria. If possible make a visit to a water purification plant.
D. A safe supply of farm water	Discussion of types of wells and their construction.
	Discussion on how water in wells becomes unfit to use.
	Experiment: How does water enter a well?
	Make a diagram of a carefully constructed well.
	Discussion on how to prepare water for safe use while camping.
IV. Conservation of Water	
A. Need for conservation	List reasons for conserving water.
B. How nature provides reservoirs	Discuss reservoirs.
C. Flood prevention	Discuss and illustrate methods of flood prevention.
	Show filmstrip.
	Make a report on a local water conservation project.

UNIT IV
WATER

Aids and References

Science Activities, Book 1, pp. 275-287
General Science, Book 1, pp. 131-145
General Science, Book 3, pp. 5-17
Science, Discovery and Progress, pp. 163-168

Science Activities, Book 1, pp. 288-296
General Science, Book 1, pp. 109-130
General Science, Book 3, pp. 24-32

Filmstrip: *The Beaver* (National Film Board)

Understandings and Generalizations

Water supplies may be contaminated in many ways.

The purification of water supply is important.

Water conservation is the concern of all of us.

SUMMARY OF EXPERIMENTS FOR UNIT IV

WATER

Experiment:

Problem: To determine if there is water in food.

Material: Bread, balance.

Method: Place equal weights of bread on each arm of the balance. Take the bread from one arm and keep in a closed container to prevent drying. Dry the bread from the other arm in an oven. Replace both on the balance.

Observation: The arm with the fresh bread dropped.

Conclusion: The heat had evaporated the water from the bread that was placed in the oven, thereby causing a decrease in weight.

Experiment:

Problem: Does water dissolve substances?

Material: Sugar, salt, chalk, baking soda, sand, a stone, soap flakes, beakers, water and a spoon.

Method: Place each of the materials in separate beakers. Add water to each. Stir to hasten dissolving action.

Observation: Sugar, salt, baking soda and soap flakes dissolved while chalk, sand and a stone did not dissolve.

Conclusion: Water dissolves a great many substances but not all substances.

Experiment:

Problem: Does heat enable water to dissolve more sugar?

Material: A beaker, water, sugar, a spoon and an alcohol burner.

Method: Place the water in the beaker. Add sugar and stir until no more sugar will dissolve. Now heat the water. Add more sugar and stir.

Observation: The water when heated dissolved more sugar.

Conclusion: Heat enables water to dissolve more sugar.

Experiment:

Problem: Can water vapor in the air be condensed?

Material: A beaker, water and pieces of ice.

Method: Place some water in the beaker. Add a few pieces of ice. Let stand for a few minutes.

Observation: Drops of water formed on the outside of the beaker.

Conclusion: The cold water in the beaker, cooled the air outside the beaker, causing the water vapor in the air to condense.

Experiment:

Problem: Can you filter or strain salt out of water?

Material: Two beakers, a funnel, filter paper, salt and water.

Method: Dissolve some salt in water in one beaker. Place the funnel in the other beaker. Put the filter paper in the funnel and pour the solution into the funnel. Taste the filtered water.

Observation: The water tastes salty.

Conclusion: You cannot filter or strain salt out of water.

Experiment:

Problem: Can you remove the salt from water by settling?

Material: Salt, water and a beaker.

Method: Dissolve some salt in a beaker of water. Let it stand for several minutes.

Observation: The water remained as it was.

Conclusion: Salt will not settle out of water.

Experiment:

Problem: To change salt water to drinking water.

Material: Florence flask, one-hole stopper, glass tubing, rubber tubing, test tube, a beaker, salt water, alcohol burner, ice and a retort stand.

Method: Place the flask on the retort stand. Put the salt water in the flask. Boil the salt water for several minutes.

Observation: Drops of water start to condense in the test tube. There was no taste of salt water in this water.

Conclusion: Salt water can be changed to drinking water by evaporation and condensation.

Experiment:

Problem: To test the scale on a pipe boiler or kettle.

Material: Scale from one of above and vinegar.

Method: Put some vinegar on the scale.

Observation: The vinegar started to bubble.

Conclusion: The scale, in the presence of vinegar, produces the same result as limestone.

Experiment:

Problem: Why is soft water used for washing?

Material: Two test tubes, hard water, soft water, soap solution, and an eye dropper.

Method: Pour soft water into one test tube until it is nearly full. Fill the second test tube with an equal amount of hard water. Label both tubes. Using the eye dropper, add, drop by drop, an equal number of drops of the soap solution to each tube shaking them after each drop has been added, until suds appear in one test tube. Keep adding drops into the other test tube until suds appear.

Observation: Suds appeared in the soft water first.

Conclusion: Soft water is used for washing as it requires less soap.

Experiment:

Problem: How can hard water be softened?

Material: Two beakers, a jar of hard water, a teaspoon, washing soda, eye dropper, and soap solution.

Method: Pour a cup of hard water into each beaker. Dissolve a teaspoonful of washing soda in one beaker. Label this beaker. Add some soap solution, drop by drop, to each beaker shaking the beaker after each drop.

Observation: Suds appeared first in the beaker that had washing soda dissolved in it.

Conclusion: Washing soda softens water.

Experiment:

Problem: To show how a siphon aids in getting a water supply.

Material: Two pails, a piece of rubber tubing four or five feet long.

Method: Fill one pail with water and place on a table. Put the empty pail on the floor. Fill the tubing with water and pinch both ends with your fingers. Hold one end in the pail of water and the other end in the empty pail. Release the pressure of both ends of the tubing at the same time.

Observation: The water flows up the tube from the pail of water and down the tube into the empty pail.

Conclusion: This siphon can be used to move water from a high level over a higher level to a lower level in a water system.

Experiment:

Problem: Does pond water contain living organisms?

Material: A microscope and some pond water.

Method: Place a drop of pond water under the microscope.

Observation: Small moving organisms are seen.

Conclusion: Pond water contains living organisms.

Experiment:

Problem: What is the effect of adding alum to muddy water in a settling basin?

Material: Two jars, muddy water, alum.

Method: Fill the jars with muddy water. Let one stand for several hours. To the other add alum, shake to dissolve the alum, and let stand for several hours. Observe each every half hour.

Observation: The particles of soil settled to the bottom in both jars, but the action was faster in the jar with alum.

Conclusion: Alum speeds the settling out of particles in muddy water.

Experiment:

Problem: Does filtering remove solid particles from water?

Material: A large flowerpot, washed gravel, fine sand with all clay washed out, muddy water, and a beaker.

Method: Put the gravel in the bottom of the flowerpot to a depth of 1½ to 2 inches. Nearly fill the rest of the pot with sand. Pour the muddy water in on the top. Catch the filtered water in a beaker below the flowerpot.

Observation: The filtered water was cleaner.

Conclusion: Filtering water removes the solid particles.

Experiment:

Problem: How does water enter a well?

Material: A beaker, large glass tubing, clean fine sand and muddy water.

Method: Put the glass tubing in the beaker near the edge. Place the sand in the beaker and against the tubing nearly filling the beaker. Pour in the muddy water.

Observation: Clean water goes through the sand into the glass tubing.

Conclusion: Water can enter a well by passing through the soil which acts as a filter.

References for other experiments on water:

1. To find out whether plants contain water. Exp. 5-1, page 75, General Science Book 1.
2. Does meat contain water? Exp. 5-2, page 75, General Science Book 1.
3. Does fruit contain water? Exp. 5-3, page 75, General Science Book 1.
4. Why do ships float? Exp. 5-5, page 84, General Science Book 1.
5. Changing water from a solid to a liquid. Exp. 6-1, page 89, General Science Book 1.
6. Changing water from a liquid to a solid. Exp. 6-2, page 89, General Science Book 1.
7. Changing water from a liquid to a gas. Exp. 6-3, page 89, General Science Book 1.
8. To show how and why dew forms. Exp. 6-4, page 92, General Science Book 1.
9. Observe ice forming on water. Exp. 6-5, page 93, General Science Book 1.
10. Which requires a lower temperature to freeze, ordinary water or a water solution? Exp. 6-7, page 94, General Science Book 1.
11. Does water contain dissolved air? Exp. 6-13, page 103, General Science Book 1.
12. How do leaf mold and mosses help forests to absorb and hold water? Exp. 6-7, page 113, General Science Book 1.
13. To make muddy water clear. Exp. 8-2, page 140, General Science Book 1.
14. Does water dissolve air? Page 4, General Science Book 3.

UNIT V — GRADE VII

PLANTS — SPRING ACTIVITIES

References:

T. W. Hunt et al: *Science Activities, Book 1,*
W. J. Gage Ltd.

J. A. Partridge: *General Science, Book 1,*
J. M. Dent & Sons

J. A. Partridge: *General Science, Book 2,*
J. M. Dent & Sons

H. Bowers et al: *General Science, Book 3*
J. M. Dent & Sons

J. E. Adair et al: *Science: Discovery and Progress,*
Clarke, Irwin & Co.

G. S. Craig et al: *Facing Tomorrow With Science,*
Ginn & Co.

Van Camp: *Fifty Trees of Canada,* Book Society
Alberta Horticultural Guide,
Department of Agriculture

Filmstrips:

Identifying Common Trees, (S.V.E.)

Forest Fires, (S.V.E.)

The Grasshopper, P-1599 (N.F.B.)

How Insects Live and Grow, (S.V.E.)

Additional Filmstrips:

How Trees Grow, P-3090 (Dowling)

Conserving Our Forest Resources, Pk-2452 (Curr.)

The Dandelion, P-1101 (D. Mail)

Our Insect Enemies and Friends, P-3023 (J. Handy)

Native Trees of Canada, P-1728 (N.F.B.)

Apparatus:

Beans and other seeds
Soil
Blotting paper
Beakers
Iodine
Onionskin paper
Fehling solution
Pie plates
Grain samples
Medicine bottle
Sand

UNIT V

PLANTS – SPRING ACTIVITIES

Content	Suggested Treatment
I. Trees A. Parts	Discuss the parts of a tree and the purposes served by each. Make a diagram of a tree and label the parts. Make a diagram of a cross-section of a tree and label the parts. Using a twig, locate terminal and lateral buds. Find out the purpose of each.
B. How We Recognize Different Kinds of trees	Discuss the five ways of recognizing trees. Field trip: Observe trees in flower. Try to locate staminate and pistillate flowers. Collect and mount leaves from different trees. Observe differences. Discuss what is meant by deciduous and evergreen. **Enrichment Suggestion: Fifty Trees of Canada.**
C. Planting of Trees	Discuss how trees can be useful and ornamental at home and at school. Discuss the importance of planning. Look at pictures of grounds. Visit parks to see the planning. Discuss the places from which trees can be obtained free for schools and farms. List things to do in planting a tree. Know how to plant a tree.
D. Care of Trees	Discuss the care of trees after planting.
E. Uses of Wood	
F. Kinds of Wood	Discuss with diagrams.
G. Importance of Forests	Discuss the value of our forests. List all the uses of forest trees.
H. Forest Fires	List causes of forest fires and ways of preventing them. Make posters on prevention of forest fires. Show filmstrip. Show filmstrip. Show filmstrip.
I. Tree Diseases	List tree diseases and discuss preventive measures.
J. Tree Pests	List insect enemies and discuss control methods
K. Cutting Practices	Discuss cutting practices.
L. Reforestation	Discussion of reforestation to get an idea as to how it is carried out.

UNIT V

PLANTS – SPRING ACTIVITIES

Aids and References	Understandings and Generalizations
Science Activities, Book 1, pp. 298-302, 318-321 *General Science, Book 1,* pp. 286-290	
General Science, Book 1, p. 46	A tree carries out many important life processes.
Science Activities, Book 1, pp. 302-310 *General Science, Book 1,* pp. 256-257 Filmstrip: *Identifying Common Trees*	
Fifty Trees of Canada *Science Activities, Book 1,* pp. 311-315 *General Science, Book 1,* pp. 293-300, 399-404, 408	Trees are important to us in many ways.
General Science Book 1, pp. 293-294	
Science Activities, Book 1, pp. 314-322	
Science Activities, Book 1, pp. 323-331 *General Science, Book 1,* p. 269 *Science, Discovery and Progress,* pp 588-589 *Facing Tomorrow with Science,* pp. 86-88	
Science Activities, Book 1, pp. 332-339 *General Science, Book 1,* pp. 270-282 *Science, Discovery and Progress,* pp. 589-592 *Facing Tomorrow with Science,* pp. 88, 93 Filmstrip: *Forest Fires—Kinds, Causes, Cost, Control* Filmstrip: *Using our Forests Wisely* Filmstrip: *Enemies of the Forest*	Conservation of forests is essential.
General Science, Book 1, pp. 285-303	
Science Activities, Book 1, pp. 339-347	

UNIT V

PLANTS — SPRING ACTIVITIES

Content	Suggested Treatment
II. Seeds A. Parts	Diagrams of monocotyledon and dicotyledon seeds naming the parts.
B. Germination	Experiment: How is a bean seed adapted to grow into a plant? Experiment: How is a corn grain adapted to produce roots, stem, and leaves of a new plant?
C. Storage of Food	Experiment: Test seeds for starch, proteins, and fats.
D. Conditions for Germination	Experiment: What conditions are necessary for germination?
E. Germination Tests	Experiment: Is there any difference in germination strength between plump, high-quality wheat and thin low-quality wheat?
F. Growth of a Seed to a Plant	Experiment: Do embryos in different kinds of seeds grow into plants in a similar manner? Make a diagram to show progress in growth.
G. Good Seed	Discuss the value of using good seeds, and the advantages of registered seed for farms and gardens.
III. Gardening A. Location	Discuss the best location. Make a plan of a garden.
B. Preparation	Discuss how to prepare the soil.
C. Care	Discuss how to care for a garden.
D. Planting	Discuss how and when to plant a garden.
E. Value	Report: The value of a vegetable garden.
IV. Improvement of Grounds A. Landscaping	Discuss the value of landscaping your grounds.
B. Soil	Discuss the value of good soil, and ways to improve the soil. Make a collection of soils in your locality.
C. Lawns	Interview owners of good lawns. Make a report on how lawns are made, maintained, and repaired.
D. Planning	Visit grounds and talk with experienced gardeners.

UNIT V

PLANTS — SPRING ACTIVITIES

Aids and References	Understandings and Generalizations
Science Activities, Book 1, pp. 350-361 *General Science, Book 1,* pp. 387-391 *Science, Discovery and Progress,* pp. 502-506	
	Seeds store food for the early development of the plant.
Science Activities, Book 1, pp. 362-366	
Science Activities, Book 1, pp. 366-378 *General Science, Book 3,* pp. 337-368	
General Science, Book 1, pp. 391-398	
Alberta Horticultural Guide	
	A vegetable garden is valuable. To be successful a gardener must have a scientific knowledge of plants.
Science Activities, Book 1, pp. 379-398	
General Science, Book 3, pp. 369-399	
	Plants make our environment more attractive.

UNIT V

PLANTS — SPRING ACTIVITIES

Content	Suggested Treatment
E. Bedding Plants	Discuss the varieties that require an early start. Report on how to start bedding plants. Start plants in wooden boxes and harden before setting out.
F. Hotbeds and Cold Frames	Discuss purpose and construction of hotbeds and cold frames, and how to grow plants in them.
G. Annuals and Perennials	List annuals and perennials suitable for your district.
H. Bulbs	List types of bulbs that can be grown in your district. Discuss how to plant and care for these.
I. Flowering Shrubs	Discuss and list bushes grown in your locality.
J. Window Boxes	Discuss how to make, plant and care for window boxes.
K. Arbor Day	Discuss things that can be done at home and at school on Arbor Day.
V. Plant Enemies	
A. Diseases	Discuss diseases of grain and garden plants, and losses caused by them. Mount healthy and diseased plants.
B. Insects	List common insect pests. Make a collection of insect pests. Study the life history of several of these. Use diagrams of insects. Show filmstrip. Discuss control measures. List common noxious weeds.
C. Weeds	Collect pictures of these. Make a collection of weed seeds. Discuss control of weeds.

UNIT V

PLANTS – SPRING ACTIVITIES

Aids and References	Understandings and Generalizations
Science Activities, Book 1, pp. 388-398	Plants make our environment more attractive.
General Science, Book 3, pp. 345-353	
Alberta Horticultural Guide	
Science Activities, Book 1, pp. 401-402	
Science Activities, Book 1, pp. 410-417 *General Science, Book 2,* pp. 72-75 *Science, Discovery and Progress,* pp. 515-525 *Science Activities, Book 1,* pp. 417-429 *General Science, Book 2,* pp. 88-105 *Science, Discovery and Progress,* pp. 532-549 Filmstrip: *The Grasshopper or How Insects Live and Grow*	The control of plant enemies is essential.
Science Activities, Book 1, pp. 430-444 *General Science, Book 1,* pp. 14-17 *Science, Discovery and Progress,* pp. 569-576	

SUMMARY OF EXPERIMENTS FOR UNIT V

PLANTS – SPRING ACTIVITIES

Experiment:

Problem: How is a bean seed adapted to grow into a plant?

Material: Several bean seeds, beaker, soil and blotting paper.

Method: Line the beaker with blotting paper. Fill the inside of the beaker with good soil. Place several bean seeds around the edge of the beaker outside of the blotting paper. Keep the soil moist, and place the beaker in a warm, bright place.

Observation: Notice that the root starts growing downward first. As the root develops the cotyledons lose the seed coat. The root system elongates and the leaves start to form and grow. The cotyledons die.

Conclusion: A bean seed contains enough stored food to enable the plant to start to grow.

Experiment:

Problem: How is a corn grain suited to produce the roots, stem and leaves of a new plant? Follow as for the above experiment. Notice that the single cotyledon remains below the surface of the ground.

Experiment:

Problem: Is starch stored in seeds?

Material: Several different kinds of seeds and iodine.

Method: Split open the seeds and place a drop of weak iodine solution on each.

Observation: A dark blue or bluish black color was observed on the seeds.

Conclusion: Seeds contain starch.

Other Experiments: Seeds could be tested for proteins and fats (oil).

Experiment:

Problem: Is moisture necessary for germination?

Material: Twenty beans or other seeds, two beakers and soil.

Method: Place ten seeds in a beaker containing dry soil.
Place the other ten seeds in a beaker containing soil under the same conditions but keep the soil in this beaker moist. After a few days see which seeds have germinated.

Observation: The seeds kept in the moist soil germinated but those kept in the dry soil did not germinate.

Conclusion: Moisture is necessary for germination.

Experiment:

Problem: Is warmth necessary for germination?

Material: Twenty beans or other seeds, two beakers and soil.

Method: Place ten seeds in one beaker containing soil. Place the other ten seeds in a beaker containing soil. Keep the soil in both moist. Keep one beaker in a warm place and the other in a cool place. Examine both in a few days.

Observation: The seeds, kept in a warm place, germinated, but those kept in a cool place did not germinate.

Conclusion: Warmth is necessary for germination.

Experiment:

Problem: Is air necessary for germination?

Material: Twenty beans or other seeds, two beakers and soil.

Method: Place ten seeds in each beaker of soil. Keep both beakers in a warm place. Keep the soil in one beaker moist and keep the soil in other beaker covered with water at all times to keep the air out. Examine in a few days.

Observation: The seeds in the beaker that was kept moist germinated. The seeds that were in the beaker that was kept completely covered with water did not germinate.

Conclusion: Air is necessary for germination.

Experiment:

Problem: Is soil necessary for germination of seeds?

Material: Twenty beans or other seeds, two beakers and soil.

Method: Plant ten seeds in soil, in one beaker. In the second beaker, put blotting paper on the bottom of the beaker. Then place ten seeds on the blotting paper. Cover these seeds with more blotting paper. Keep seeds moist in both beakers. Examine the seeds in both beakers after a few days.

Observation: The seeds in both beakers germinated.

Conclusion: Soil is not necessary for germination.

Experiment:

Problem: Is light necessary for germination?

Material: Twenty beans or other seeds, two beakers and soil.

Method: Plant ten seeds in soil, in each beaker. Keep the soil in both beakers moist. Put one beaker in a dark cupboard and the other in a window. Keep both at the same temperature. After a few days examine the seeds.

Observation: The seeds in both beakers germinated.

Conclusion: Light is not necessary for germination.

Experiment:

Problem: Is there any difference in germinating strength between good seed and poor seed?

Material: Four plates, blotting paper, samples of plump wheat and samples of shrunken wheat.

Method: Cover the bottom of two plates with blotting paper. Count out one hundred plump kernels and place on one plate. Count out one hundred shrunken kernels and place on the other plate. Cover the seeds with blotting paper. Invert the other two plates over the two with seeds in them. Place in a warm place. Keep the blotting paper wet but do not have the seeds standing in water. Make a table to show the number of seeds that germinate daily, and check daily.

Observation: The good seed germinated much better than the poor seed.

Conclusion: Good seed germinates faster and with higher percentage than poor seed.

Alternative Experiment: The rag-doll seed germinator. Science Activities, Book 1, p. 314.

Experiment:

Problem: Do embryos in different seeds grow into plants in a similar manner?

Material: Beakers, several kinds of seeds, blotting paper and sand.

Method: Line the beaker with blotting paper and then fill with sand. Plant several kinds of seeds between the blotting paper and the beaker. Keep the sand moist. Keep the beaker in a warm place out of direct sunlight. Watch the growth carefully.

Observation: All the seeds did not grow in the same manner.

Conclusion: The embryos in different seeds can grow into plants in different ways.

Experiment:

Problem: To test the percentage of germination of seeds. The experiment on "Is there any difference in the germinating strength between good and poor seed?" could be used for this.

Experiment:

Problem: To show the swelling power of germinating seeds.

Material: A large quantity of dry bean seeds, a medicine bottle, tumbler, and water.

Method: Pack as many dry bean seeds as possible into the medicine bottle. Screw the cap on loosely and turn it upside down into a tumbler full of water. Let stand for a few days and observe.

Observation: The medicine bottle was broken.

Conclusion: Germinating seeds swell and can exert a great force to get extra space.

Grade Eight

COURTESY ALBERTA GOVERNMENT PHOTOGRAPHERS

A LIVE SPECIMEN FOR EXAMINATION

GRADE VIII — UNIT I

THE GREAT ANIMAL KINGDOM

References:

T. W. Hunt et al: *Science Activities, Book 2,*
W. J. Gage

W. L. Beauchamp et al: *Science Problems, Book 1,*
Scott Foresman

J. A. Partridge: *General Science, Book 2,*
J. M. Dent

E. D. Curtis & J. Urban: *Biology in Daily Life,*
Ginn & Co.

G. S. Craig et al: *Learning With Science,* Ginn & Co.

G. S. Craig et al: *Facing Tomorrow With Science,*
Ginn & Co.

J. E. Adair et al: *Science Discovery and Progress,*
Clarke, Irwin & Co.

W. R. Salt & A. L. Wilk: *Birds of Alberta,*
Queen's Printer, Edmonton

R. T. Peterson: *A Field Guide to Birds East of the Rockies*

R. S. Palmer: *The Mammal Guide, Mammals of North America, North of Mexico*

Wood: *Birds and Animals of the Rockies*
Man and His Biological World

Filmstrips:

Living Jewels of the Day—Butterflies, (Curriculum)

Our Hawks, Their Homes and Habits, Pk-3123 (Curriculum)

Our Owls, Their Homes and Habits, Pk-3124 (Curriculum)

Birds of the Lake and Marsh, Pk-3127 (Curriculum)

A Visit to Gull Island, Pk-3121 (Curriculum)

Our Very Friendly Birds, Pk-3122 (Curriculum)

Our Grouse, Their Homes and Habits, Pk-3126 (Curriculum)

Feathered Friends of the Lakeshore, Pk-3120 (Curriculum)

Our Gnawing Animals, Pk-3125 (Curriculum)

Our Hoofed Animals, Pk-3128 (Curriculum)

Living Jewels of the Night—Moths, (Curriculum)

Apparatus:

Lime water

Microscope

Aquarium

Insect killing bottle

UNIT I

PART I—THE GREAT ANIMAL KINGDOM

Content	Suggested Treatment
I. Comparing plants and animals	List a dozen plants and animals from your immediate environment.
A. Similarities	Discuss and record their common characteristics.
B. Differences	Discuss the important ways in which people differ from trees.
	Discuss the meaning of animal adaptation.
	Enrichment Suggestion: Find out about those borderline forms of life which have some plant characteristics.
II. Invertebrates—Animals without backbones A. General characteristics	Separate all of the animals, illustrated on page 30 of Science Activities, into two major groups. What is the most important difference between these groups?
B. Protozoans	Discuss the common characteristics of protozoans. Where do we find them? How large are they? In what ways are they important to us?
	Enrichment Suggestions: Using a microscope, observe some of the protozoans in a drop of stagnant water. Draw a few of them. Find out how the amoeba lives and reproduces.
C. Sponges	Bring a natural sponge to school and examine it. Discuss the structure of sponges. How do they carry on their life processes?
	Try to find some fresh-water sponges in the ponds near your school.
	Enrichment Suggestion: Try to find out how commercial sponges are gathered and prepared.
D. Flatworms and Roundworms	What are flatworms like, and where do we find them? In what ways are flatworms important to us?
	What are roundworms like, and where do we find them? In what ways are roundworms important to us?
	Discuss the life history of either a species of tapeworm or the trichina worm.

UNIT I

PART I – THE GREAT ANIMAL KINGDOM

Aids and References	Understandings and Generalizations
Science Activities, Book 2, pp. 24-29 *Science Problems, Book 1,* pp. 260-273 *General Science, Book 2,* pp. 69, 75, 76 *Biology in Daily Life,* pp. 39-57 *Learning with Science,* pp. 112-113	Scientists are able to classify living things by grouping those forms which are alike in structure.
Science Activities, Book 2, pp. 29, 30 *General Science, Book 2,* pp. 78, 79	
Science Activities, Book 2, pp. 30, 31 *Science Problems, Book 1,* p. 265 *Science Problems, Book 1,* pp. 54, 55 *Biology in Daily Life,* pp. 513-515	
Science Activities, Book 2, pp. 31, 32 *Science Problems, Book 1,* pp. 53, 54 *Biology in Daily Life,* pp. 515-517	
Science Activities, Book 2, pp. 32, 33 *Science Problems, Book 1,* pp. 50, 51 *Biology in Daily Life,* pp. 519-522 *Facing Tomorrow with Science,* pp. 43, 44	

UNIT I

PART I—THE GREAT ANIMAL KINGDOM

Content	Suggested Treatment
	Enrichment Suggestion: Find out all you can about the serious menace of flatworms and roundworms, particularly in undeveloped lands.
E. Segmented Worms	Bring some earthworms into the classroom and examine them. In what ways are earthworms a more highly developed form of life than those so far discussed?
	Where do we find leeches and how do they live?
	Enrichment Suggestion: Read about the interesting life cycle of the earthworm.
F. Spiny-skinned animals	In what ways are all of these animals alike? How do they move about, and how do they obtain their food?
G. Mollusks	Study the structure of mollusks and identify the three common groups. How do they live? Bring snails and slugs to your classroom and observe them. Keep the snails in your aquarium. Keep the slugs in a moist place and feed them lettuce. Collect and study the shells of mollusks. How are mollusks important to us?
H. Arthropods	Discuss the common characteristics of arthropods. In what ways are they a very highly developed group of animals?
1. Crustaceans	Discuss the life of a common crustacean. Bring some pond water into the classroom and look for such crustaceans as cyclops, water fleas and scuds in it. For a short time in the spring, you ought to be able to find fairy shrimps in shallow ponds and roadside ditches. Find out how these animals spend the long period of the year when they are inactive.
2. Centipedes and millipedes	Look under logs and stones and other damp places for these animals, and bring them into the classroom for study.
3. Arachnids—the spider group	Discuss briefly the members of the arachnid group. Study a spider and a grasshopper and record as many differences as you can.
	Enrichment Suggestion: Find out all you can about the web of spiders and how they are spun.

UNIT I

PART I—THE GREAT ANIMAL KINGDOM

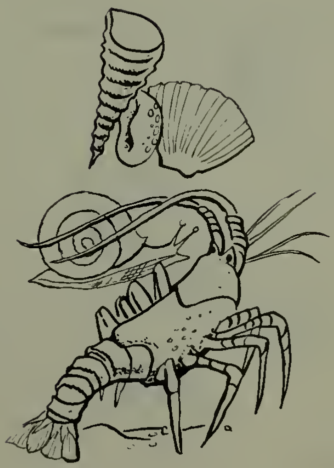
Aids and References

Science Activities, Book 2, pp. 33, 34
General Science, Book 2, pp. 46-49
Science Problems, Book 1, pp. 49, 51
Biology in Daily Life, p. 523

Science Activities, Book 2, pp. 34, 35
Science Problems, Book 1, p. 52
Biology in Daily Life, pp. 523, 524
Science Activities, Book 2, pp. 35-37
Science Problems, Book 1, pp. 48-50
General Science, Book 2, pp. 57-59
Biology in Daily Life, pp. 524-526

Science Activities, Book 2, pp. 37-54
General Science, Book 2, pp. 1-21, 83-106
Science Problems, Book 1, pp. 43-47
Science, Discovery and Progress, pp. 529-556
Biology in Daily Life, pp. 527-533
Facing Tomorrow with Science, pp. 34-36

Understandings and Generalizations



UNIT I

PART I—THE GREAT ANIMAL KINGDOM

Content	Suggested Treatment
4. Insects	Discuss the importance of insects, and the reasons why they have been able to survive in such large numbers.
	Study a number of insects and list as many of their characteristics as you can.
	How do insects see, hear, breathe, communicate, move about and feed?
	How do insects assist man?
	In what ways are insects harmful?
	Bring insects such as cabbage butterflies and mosquitoes into your classroom, and try to rear them through the succeeding stages of their life cycles.
	Read about the interesting life cycles of such insects as mayflies and cicadas.
	Show filmstrips.
	Enrichment Suggestion: Write to the Entomology Department, University of Alberta for information about making and naming insect collections. Make a collection of many of the insects of your area.
III. Vertebrates—Animals with Backbones	Discuss the five groups of vertebrates with specific reference to local forms. What characteristics do they all have in common?
A. Fish	Bring fish or minnows into your classroom and place them in an aquarium. Discuss their adaptations for living in water.
	Enrichment Suggestion: Read about the long history of fish on earth, and trace their development down through the ages.
B. Amphibians	Discuss the ways in which all amphibians are alike, and the common members—frogs, toads and salamanders. How do these differ from each other?

UNIT I

PART I—THE GREAT ANIMAL KINGDOM

Aids and References

Filmstrip: *Living Jewels of the Day—Butterflies*

Filmstrip: *Living Jewels of the Night—Moths*

Science Activities, Book 2, pp. 54, 55
General Science, Book 2, pp. 76, 77
Science Problems, Book 1, pp. 36-43
Biology in Daily Life, pp. 537, 538

Science Activities, Book 2, pp. 55-58
General Science, Book 2, pp. 53-57
Science Problems, Book 1, p. 42
Biology in Daily Life, pp. 539, 540

Science Activities, Book 2, pp. 58-62
General Science, Book 2, pp. 59-65
Science Problems, Book 1, pp. 40-42
Biology in Daily Life, pp. 540,541

Understandings and Generalizations

There are many different kinds of animals without backbones. The lower ones are relatively simple, while the higher groups are complex.

UNIT I

PART I—THE GREAT ANIMAL KINGDOM

Content	Suggested Treatment
	Have examples of amphibians brought into the classroom. Place them in a terrarium such as the one illustrated on page 61 of Science Activities, and study them at first-hand. Have a very few (about a dozen) frog's eggs brought into the classroom in the spring. Place them in a simple aquarium (a pickle jar will do) and feed the tadpoles sparingly with Natural Fish Food, (often used for goldfish). Record the development from egg to adult.
C. Reptiles	What animals belong in the reptile group? What are their common characteristics and how are they adapted to their way of life? Are they useful or harmful to mankind?
D. Birds	In what ways are birds unlike all other vertebrates? Discuss their special adaptations for flight (and migration), for procuring their food, and for protection against enemies and weather. Have pupils bring in different types of feathers. Examine them carefully and note such characteristics as flexibility, strength, lightness in weight and provision for insulation. Discuss bird migration and sketch maps of the major flyways in North and South America. Keep records of winter residents, and returning migrants in the spring. Discuss the importance of birds to man. Try to take field trips in order to observe birds. **Enrichment Suggestion: Read about the early history of birds as determined by fossils.** Show filmstrips.

UNIT I

PART I — THE GREAT ANIMAL KINGDOM

Aids and References

Understandings and Generalizations

Science Activities, Book 2, pp. 62, 63
General Science, Book 2, pp. 49-53
Science Problems, Book 1, pp. 39-41
Biology in Daily Life, pp. 542-546
Science Activities, Book 2, pp. 64-72
General Science, Book 2, pp. 32-44, 107-130
Science Problems, Book 1, p. 39
Biology in Daily Life, p. 547
Birds of Alberta
A Field Guide to the Birds East of the Rockies

Filmstrip: *Our Hawks, Their Homes and Habits*
Filmstrip: *Our Owls, Their Homes and Habits*
Filmstrip: *Birds of Lake and Marsh*
Filmstrip: *A Visit to Gull Island*
Filmstrip: *Our Very Friendly Birds*
Filmstrip: *Our Grouse, Their Homes and Habits*
Filmstrip: *Feathered Friends of the Lakeshore*
Filmstrip: *Feathers, Beaks and Feet of Birds* (3 filmstrips)

UNIT I

PART I — THE GREAT ANIMAL KINGDOM

Content	Suggested Treatment
E. Mammals and some of the chief mammal groups	Discuss the main characteristics of mammals, and some of the interesting ways in which they are adapted to survive. Collect as many pictures of mammals as you can. Group them and make a bulletin board display. Study as many as you can at first hand.
1. Insectivores	Try to catch shrews alive by digging a small pail into ground level, and baiting it with a mouse or bit of meat. Bring them into the classroom, and study them in an improvised terrarium. Be sure to feed them fresh meat often, as they will starve in a few hours.
2. Bats	Study the special adaptations of bats. Encourage pupils to bring these interesting animals to class. Release them after studying them.
3. Carnivores	In what ways are carnivores adapted to their way of life? Discuss their usefulness to man. List as many carnivores common to your district as you can.
4. Rodents	Discuss the special adaptations of rodents, their great numbers, and their harmfulness or usefulness to man. Show suggested filmstrip. **Enrichment Suggestions: Rodents are the commonest mammals in Alberta. We have no fewer than thirty-five different kinds belonging to eight different families. Find out as much as you can about these. Find out all you can about the life history of any one native rodent.**
5. Rabbits and Hares	In what ways do rabbits and hares differ from true rodents? How are rabbits different from hares? Discuss the three common members of this group in Alberta.
6. Hoofed Animals	What different kinds of hoofed animals are native to Alberta, and how are they adapted to their way of life? Show suggested filmstrip.

UNIT I

PART I—THE GREAT ANIMAL KINGDOM

Aids and References

Science Activities, Book 2, pp. 72-76

General Science, Book 2, pp. 22-31

Science Problems, Book 1, p. 38

Biology in Daily Life, pp. 547-550

The Mammal Guide—Mammals of North America North of Mexico

Birds and Animals of the Rockies

Science Activities, Book 2, pp. 76, 77

Science Activities, Book 2, p. 77

General Science, Book 2, pp. 29-31

Science Problems, Book 1, p. 38

Science Activities, Book 2, pp. 77, 78

General Science, Book 2, pp. 29-31

Science Activities, Book 2, pp. 78-80

General Science, Book 2, pp. 26-31

Filmstrip: *Our Gnawing Animals*

Science Activities, Book 2, pp. 80, 81

Science Activities, Book 2, pp. 81-85

General Science, Book 2, pp. 29-31

Filmstrip: *Our Hoofed Animals*

Understandings and Generalizations

Special Note: Remember that the only insectivores which we have in Alberta are shrews. The animals which we call moles are really pocket gophers.

Vertebrates are the most highly developed in the scale of life. They have the greatest variety of structure and the most highly developed systems of nerves, circulation, hearing, digestion and reproduction.

UNIT I

PART II — CONSERVING CANADA'S WILDLIFE

Content	Suggested Treatment
I. The Necessity for Conserving Wildlife	Discuss the reasons why conservation of wildlife is vital today.
A. Direct depletion by man	Contrast the abundance of wildlife in the early days of Canada with its relative scarcity today. Draw attention to the many species which have become extinct. Discuss the UNESCO report of 1958 regarding wildlife problems. **Enrichment Suggestions: Prepare report on the activities of man which led to the extinction of such species as the Eskimo curlew, great auk and passenger pigeon.** **Report on the attempts to save the near-extinct whooping crane.**
B. The destruction of habitats	Discuss the importance of natural habitat to forms of wildlife. **Enrichment Suggestions: Report on the destruction of habitat by excessive cultivation and spraying with poisons. In what ways may habitat be maintained or even restored?**
II. The Balance of Nature	Discuss the struggle for existence which tends to lead to balance in wildlife populations. Consider specific examples such as the relationship between lynx and snowshoe hare populations, coyote and mouse populations, etc. Discuss an example of a food chain.
III. Methods of Conserving Wildlife A. The work of governments	Discuss the importance of game laws, restocking programs and provision for the setting up of game preserves and wildlife sanctuaries.
B. The work of farmers and lumbermen	How can farmers and lumbermen aid in wildlife conservation?
C. Conservation as an individual responsibility	How can citizens assist other agencies in the conservation of our wildlife?
D. The need for conservation of wild flowers	Discuss the chief ways in which wild flowers have been destroyed and what we should do to prevent further destruction.
E. The need for conservation of birds	Discuss the importance of birds in the control of weeds, harmful insects and destructive rodents. Study the charts on page 119 of Science Activities and emphasize that the birds of prey are among our most useful birds and should be carefully protected. Pupils should be made aware of the fact that hawks and owls are protected by law in Alberta. Discuss ways in which birds might be encouraged through the construction of bird houses, shelters, feeding stations, etc.
F. Behaviour of a conservationist	Discuss specific ways in which young people can help to conserve our wildlife resources.

UNIT I

PART II—CONSERVING CANADA'S WILDLIFE

Aids and References

Science Activities, Book 2, pp. 89-98
Biology in Daily Life, p. 117
Man and His Biological World, pp. 322-324, 365-367

Man and His Biological World, pp. 340-368
Biology in Daily Life, pp. 118-119
Science Activities, Book 2, pp. 94-97

Science Activities, Book 2, pp. 99-104
General Science, Book 2, pp. 132-146
Science Problems, Book 1, pp. 358-365
Science, Book 2, p. 226

Science Activities, Book 2, pp. 104-126
Science Problems, Book 2, pp. 425-429
General Science, Book 2, pp. 107-130
Science, Book 2, pp. 220-226
Science Activities Book 2, pp. 108-109
Biology in Daily Life, pp. 72, 77, 140

Science Activities, Book 2, pp. 109-110
Biology in Daily Life, pp. 77-104

Science Activities, Book 2, pp. 110-115

Science Activities, Book 2, pp. 116-126
Biology in Daily Life, pp. 77-140

Science Activities, Book 2, p. 123

Understandings and Generalizations

Conservation is everybody's business. Many of the problems of conservation are urgent, demanding immediate attention. Conservation is primarily a matter of education.

Generally speaking wildlife should be left as found.

GRADE VIII "Transition Units" for 1959-60

The new science courses in Grade VII and VIII contain some material not previously included as well as a re-arrangement of much of the old material. Grade VIII classes proceeding with the new course would therefore be taught material already covered in Grade VII and also would miss some parts of the new course entirely.

For science teachers who wish to ensure that their Grade VIII classes will not miss parts of the new science courses the following plan of study for the school year 1959-60 is suggested.

Suggested time distribution:

Unit I-Plants and Animals - 8 weeks
Unit II-Magnetism and Electricity - 5 weeks
Unit III-The Solar System - 6 weeks
Unit IV-Weather - 8 weeks
Unit V-Domestic Animals and Plants - 9 weeks

Unit I - Plants and Animals

Grade VII, Unit I - Plants, Fall Activities.
Grade VIII, Unit I - Animals

Unit I of the Grade VII course should be taught in full; however, the following sections might be given only cursory treatment or omitted.

Section V - Gardening.
Section VII - Plants and Clothing.

Animal classification should be reviewed with emphasis on Birds and Mammals. Not more than two weeks should be spent on this section.

Unit II - Magnetism and Electricity

The section on magnetism should be treated lightly since this material was covered in Grade VII.

Unit III - The Solar System

Material on stars, constellations and galaxies will have been taken in the unit "Beyond the Solar System" and should only be reviewed briefly.

Unit IV - Weather

No change from Grade VIII course outline.

Unit V - Domestic Animals and Plants

Grade VII, Unit V - Plants, Spring Activities.
Grade VIII, Unit V - Domestic Animals.

The Unit V above represents two complete units of the new science courses. In order to cut the time needed to cover this double unit it is suggested that limited treatment be given to the following:

Grade VII, Unit V, section III Gardening
Grade VII, Unit V, section IV Improvement of Grounds
Grade VIII, Unit V, Domestic Animals -- Details as to common breeds. (Deal with only one or two of the major breeds in each group.)

GRADE VIII – UNIT II

MAGNETISM AND ELECTRICITY

References:

T. W. Hunt et al: *Science Activities, Book 2,* W. J. Gage
Science on the March, Unit 9, Thomas Nelson

H. Bowers and R. N. Bissonnette: *General Science, Book 3,* J. M. Dent

Basic Science Ed. Series: *Magnets,* Copp Clark

H. L. Cubank et al: *Basic Physics,* MacMillan

G. O. Blough and A. J. Huggett: *Elementary School Science and How To Teach It,* MacMillan

H. O. Lead and R. F. Rivard: *Experiments in Elementary Science,* Sir Isaac Pitman & Sons

J. E. Adair et al: *Science, Discovery and Progress,* Clarke, Irwin & Co.
Science on the March, Unit 8, Thomas Nelson

Basic Science Ed. Series: *Electricity,* Copp Clark
Classroom Aids for Teachers, Dept. of Education

Filmstrips:

Permanent Magnets, S.V.E.

What is Magnetism, McGraw-Hill

About Magnets, Filmstrip House

Electricity, S.V.E.

Frictional Electricity, Y.A.F.

Apparatus:

Magnetite
bar-magnet—steel
bar-magnet—alnico
horseshoe magnet
blueprint paper
compass
dipping needle
fuses
pith balls
ebonite rod
cat skin
glass rod
electroscope
dry cells
copper wire
copper and zinc strips
galvanometer
door bell
electric motor
sockets and bulbs
knife switch
battery jar
nichrome wire
iron filings
fuse wire
telephone model
volt-ammeter
coil primary and secondary
telegraph key and sounder

UNIT II

MAGNETISM AND ELECTRICITY

Content	Suggested Treatment
I. Magnetism	Read the story of the discovery of magnetism. A report on the work of Michael Faraday.
A. Natural magnets	Experiment: See *Science Activities, Book 2,* p. 129.
B. Artificial magnets, magnetic poles, keepers, magnetic fields, magnetic shielding	Experiment: Test materials for attraction and determine which are magnetic substances. Experiment: Shield the poles of a magnet with various substances and determine which prove to be the best for shielding.
C. Making artificial magnets	Experiment: Make a magnet (a) single touch method (b) double touch method (c) induction method (d) electro-magnetic method (Reserve for later).
D. Magnetic lines of force	Experiment: Using iron filing show the lines of force about a magnet. Use both bar and horseshoe magnet. Show the lines of force with the magnet in various positions e.g. like poles together, unlike poles etc.
E. The law of magnetic attraction and repulsion	Experiment: See *Science Activities, Book 2,* pp. 134-135.
F. The test for magnetism	Experiment: See *Science Activities, Book 2,* pp. 135-136.
G. The nature of magnetism 1. broken magnets (each part is a magnet) 2. molecular magnets	The experiments in *Science Activities, Book 2,* pp. 138-141 should be performed.
H. The destruction of magnetism	Experiment: (1) make a magnet, test and heat it, test again. (2) make a magnet, test it, and pound it, test again.
I. The earth as a magnet	Experiment: make a dipping needle and try it over a magnet. See *Science Activities, Book 2,* p. 144. Explain how the dipping needle is used to locate the magnetic poles of the earth.
J. The compass	Learn how to read a compass. Explain magnetic declination. Find the magnetic declination of your locality.
K. Everyday uses of permanent magnets	Try to find practical uses. (If possible bring some to class, e.g. pot-holders, can openers, toys, pad and pencils, tack hammers, etc.)
	Enrichment Suggestions: 1. All about Electricity (Freeman) E. N. Hale. **2. The Bright Design (Shippen) MacMillan.** **3. Additional experiment.** Show filmstrips.

UNIT II

MAGNETISM AND ELECTRICITY

Aids and References	Understandings and Generalizations
Science Activities, Book 2, pp. 128-134 *Science on the March, Unit 9,* pp. 7, 8 *General Science, Book 3,* p. 184 Encyclopaedia *Magnets*—Basic Science Education Series, pp. 3-11 *Basic Physics*—Experiment 8, p. 355	A magnet attracts certain other metals. It has a north and a south pole.
Science on the March, Unit 9, pp. 10-12 *Basic Physics,* Experiment No. 6, p. 354 *Basic Physics,* Experiment No. 9, p. 356 *Science Activities, Book 2,* pp. 136, 137	Magnets may be natural or artificial. They may be temporary or permanent. Some materials are magnetic and others are non-magnetic. Some substances let lines of force pass through—others do not.
Science Activities, Book 2, pp. 142-144 *Science on the March, Unit 9,* pp. 16-19	There are lines of force about a magnet.
Science Activities, Book 2, pp. 134-141 *Magnets*—Basic Education Series, pp. 11-15	Unlike poles attract—like poles repel.
	1. Each molecule of a magnetic substance is a magnet. 2. The alignment of such molecules is responsible for our common magnets.
Science Activities, Book 2, pp. 144-154 *General Science, Book 3,* pp. 188-189	The earth is a magnet.
	The compass is an important direction finder.
	Magnets have many uses.

Filmstrips:

Permanent Magnets (S.V.E.)
What is Magnetism (McGraw-Hill)
About Magnets (Filmstrip House)

UNIT II

MAGNETISM AND ELECTRICITY

Content	Suggested Treatment
II. Static Electricity (Electricity at Rest) A. Early history of static electricity	Reading and reporting about the experiments performed by Thales, Gilbert, Gray, duFay and Franklin.
B. Production of static electricity	Experiment: 1. Comb drawn through hair will pick up paper. 2. Comb rubbed on a wool sweater—same result. 3. Scuff feet on a wool rug—touch another person or metallic object. 4. Use an ebonite rod, glass rod, cat's fur, silk, small scraps of paper, sawdust. 5. Paper doll experiment.
C. Kinds of electrical charges	Experiment: Show that there are different kinds of electrical charges, and establish the law of electrical charges.
D. The pith-ball electroscope	Experiment: Study the use of the pith-ball electroscope.
E. The gold-leaf electroscope	Experiment: Study the gold-leaf electroscope and its use.
F. Conductors and insulators	Experiment: Distinguish between conductors and insulators.
G. Lightning	Discuss the nature of lightning.
H. Thunder	Discuss the nature of thunder.
I. The control of static electricity	Discuss the reasons for using lightning rods, chains from the frame to the ground on a gasoline truck, using care with dry cleaning materials, etc. Emphasize the importance of proper grounding of lightning rods.
III. Electricity at rest and in motion A. Relation between magnetism and electricity	Show filmstrips.
B. The magnetic field surrounding a conductor	Experiment: Is there a magnetic field about a wire carrying an electric current?
C. A conductor cutting the lines of force of a magnetic field	Experiment: Thrust a bar-magnet rapidly in and out of a coil of wire and test with a compass, and a galvanometer.
D. Electro-magnets	Experiment: Make an electro-magnet.
E. The strength of an electro-magnet	Experiment: With the above magnet (1) vary the number of turns of wire (2) vary the strength of the current.
F. The polarity of an electro-magnet (left-hand rule)	Experiment: Check polarity with a compass and by the left-hand rule.

UNIT II

MAGNETISM AND ELECTRICITY

Aids and References	Understandings and Generalizations
Elementary Science and How To Teach It, pp. 422, 423 Encyclopaedia *Electricity,* Basic Science Education Series	
Science Activities, Book 2, pp. 157-158 *Basic Physics*—Experiment 12, p. 358 *Experiments in Elementary Science,* pp. 400-407 *General Science, Book 3,* pp. 190-194	Static electricity is produced by friction.
Basic Physics—Experiment No. 13, p. 359 *Science Activities, Book 2,* pp. 160, 161	The material used to produce static electricity determines the type of charge produced (positive or negative). Like electrical charges repel — unlike attract.
Science Activities, Book 2, pp. 161-163 *Basic Physics,* Experiment 14, p. 359 *Basic Physics,* Experiment 15, p. 360	There are different kinds of electrical charges. These charges can be identified as positive or negative by means of the electroscope.
Science Activities, Book 2, pp. 163, 164 *Basic Physics,* Experiment 16, pp. 360, 361	Some materials are good conductors. (Electrons move readily through them.) Some materials are good insulators. (Electrons do not move readily through them.)
Science Activities, Book 2, pp. 165-167	Lightning is static electricity built up in clouds and then discharged. Thunder is the collision of heated air particles producing noise after lightning has discharged. Static electricity often causes accidents.
Filmstrips: *Electricity* *Frictional Electricity*	
Science Activities, Book 2, pp. 168, 169 *Basic Physics,* Experiment 31, p. 373 *General Science, Book 3,* p. 201 *Science, Discovery and Progress,* pp. 325-327	Magnetism and electricity are closely related. A wire carrying an electric current produces a magnetic field.
Science Activities, Book 2, pp. 169-170 *Basic Physics,* Experiment 32, p. 374 *General Science, Book 3,* p. 202	Electricity is caused to flow when a conductor cuts the lines of force of a magnetic field.
Science Activities, Book 2, pp. 170-173 *General Science, Book 3,* p. 202 *Science, Discovery and Progress,* pp. 327, 328 *Basic Physics,* Experiment 33, p. 375	The strength of an electro-magnet depends on (1) the number of turns of wire (2) the strength of the current.

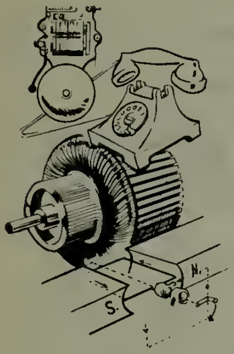
UNIT II

MAGNETISM AND ELECTRICITY

Content	Suggested Treatment
G. Uses of electro-magnets	(1) Examine an electric bell (buzzer). Make a well-labelled diagram indicating the essential parts. (2) Make a home-made telegraph set. (3) Examine the parts of a telephone. (4) A large diagram of each of the above for wall display. (5) Discuss other uses such as in flour mills (to remove metal from the flour) and in surgery (to remove metal from flesh). (6) Pupils' reports on the work of each of: Oersted, Ampere, Bell, Morse, Field and Bright. **Enrichment Suggestions: Construct an electric bell. Reading the Bright Design (Shippen). Build a model electric crane.**
IV. Electricity in Motion	
A. Current Electricity	Experiment: Construct a simple voltaic cell. Test for current flow with a galvanometer. Pupil Report: The work of Volta.
B. The electric circuit	Experiment: Connect an electric bell to two dry cells. Include switch in the circuit, open and close it.
C. Producing electricity chemically	Activity: Dismantle a dry cell and show the parts, (a large diagram for the class produced by a committee). A committee should produce a large diagram for wall display. Discuss the mercury cell.
D. A battery (2 or more cells)	Experiment: Set up two or more simple voltaic cells and connect in series. Test for current.
E. Storage battery	Activity: Dismantle a storage battery and show its parts (be careful of the chemicals). Show cells connected in series and in parallel.
F. An electric generator (dynamo)	Activities: Examine diagrams of simple generators. Explain the principle. Compare the voltage with water pressure. Explain commutator brushes. Use a hand-cranked dynamo. Dismantle an old generator. Pupil Report: The work of Michael Faraday.
G. Alternating and direct current	Explain the construction and use of the commutator.
H. A simple electric motor	Construct a simple electric motor.

UNIT II

MAGNETISM AND ELECTRICITY

Aids and References	Understandings and Generalizations
	Electro-magnets have many practical uses.
Science Activities, Book 2, pp. 184-194 	A complete circuit is necessary for a current of electricity to flow.
Science Activities, Book 2, pp. 196-213	Many agents may be used as a source of power to produce electricity.
	A coil of wire (armature) rotated in a magnetic field is a simple generator.
	Generators and electric motors are basically the same, but have different uses.

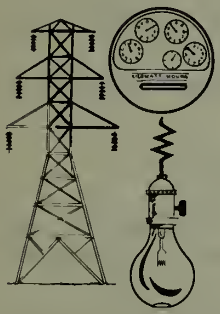
UNIT II

MAGNETISM AND ELECTRICITY

Content	Suggested Treatment
I. Electric power plants	Discuss and show diagrams of the various types. Essay: Trace electrical energy from water, coal, oil, gas and atomic energy back to the sun. (Include clear diagrams.) Discuss the sources of energy: (1) water—types of water wheels and turbines (2) wind—wind chargers (3) steam—steam turbines (4) diesel and gasoline engines (5) solar batteries (6) atomic power
J. Sources of energy to produce electricity	Visit a power plant (if possible). Discussion of Alberta power plants. Discussion of the St. Lawrence Seaway and power. Activities suggested in the text. Discuss distribution of electrical energy.
K. Electricity in the home	Discussion of (a) Source of power (b) Power house (c) Transmission lines (d) Sub-stations (e) Transformers, step up, step down (f) Meters (reading) (g) Switches and fuses Measurement of electricity and costs. (1) watt (2) kilowatt (3) kilowatt hour (4) rates Perform the activities suggested in the text.
L. Heat from electricity	Discuss short circuits. Do experiments shown in the text to demonstrate short circuits. Dangers of worn insulation or electrical cords—Necessity for repair or replacement should be impressed. Show how to repair a cord.
M. Resistance	Test the resistance of the following: copper, iron, aluminum, rubber, paper, plastic, nichrome wire.
N. Heating appliances	Examine as many as possible. Have the class (or certain number) dismantle and put together a discarded electric iron, toaster, block heater, stove element, kettle, fry-pan, bottle warmer, etc. A collection of these for future use and reference should be made.

UNIT II

MAGNETISM AND ELECTRICITY

Aids and References	Understandings and Generalizations
Science Activities, Book 2, pp. 214-221	
	
Science Activities, Book 2, pp. 221-228	Electricity flows easily in some materials and less easily in others.
Company books and pamphlets are valuable references. See *Classroom Aids for Teachers*	Electricity flowing through a high resistance produces heat. This has been used to improve our living standards.

UNIT II

MAGNETISM AND ELECTRICITY

Content	Suggested Treatment
O. Light from electricity	Pupil's report on Edison's contributions to artificial lighting. Report on the History of Lighting. Report on the History of Electric Lighting. Try to obtain examples (pictures may have to be substituted in some cases) in each of the following: (a) arc light (b) incandescent lamp (c) old carbon lamp (d) fluorescent lamp (avoid examining broken tubes, they are dangerous!) (e) mercury vapor lamp (most towns use them for street lighting) (f) neon lights (g) flash bulbs Dismantle a light bulb to examine parts.
P. Mechanical energy from electricity	Obtain samples of the following and dismantle some to show parts: Vacuum cleaner, polisher, food mixer, shaver, clippers, clock, tool grinders. Larger appliances include — refrigerator, washing machine, garbage disposal, milking machine, etc.
Q. Communication	Study or report on: Telegraph, telephone, radio, television. Discuss the work of Marconi. Use simple diagrams to illustrate the principles of radio and T.V. transmission and reception. Discuss the uses made of such communication devices aside from the entertainment value. **Enrichment Suggestions: (1) Carry out electroplating using silver, gold, copper, and chrome. (2) Ohm's Law (3) Thermostat—take one apart and explain. (4) Radio and T.V. Simple explanations. (5) Find out how electric clocks are synchronized.**

UNIT II

MAGNETISM AND ELECTRICITY

Aids and References	Understandings and Generalizations
Science Activities, Book 2, pp. 227-240	Electricity flowing through high resistance materials or certain gases may produce light.
Science on the March, Unit 8	Electricity is largely responsible for our high living standard.

SUMMARY OF EXPERIMENTS FOR UNIT II

MAGNETISM AND ELECTRICITY

Experiment: Polarity of a magnet. Science Activities, Book 2, page 129.

Experiment: Test various materials for attraction and determine which are magnetic substances.

Experiment: Shield the poles of a magnet with various substances, and determine which prove to be the best for shielding.

Demonstration: Make a magnet
(a) single touch method.
(b) double touch method.
(c) induction method.
(d) electro-magnetic method (reserve for later).

Experiment: How like and unlike poles affect one another. Science Activities, Book 2, pages 134, 135.

Experiment: Determining if a piece of iron is magnetized. Science Activities, Book 2, pages 135, 136.

Experiment: Is each part of a magnetized steel wire a magnet? Science Activities, Book 2, pages 138.

Experiment: Magnetizing small pieces of iron. Science Activities, Book 2, pages 140, 141, No. 1.

Experiment: Effect of heat on a magnet. Science Activities, Book 2, page 141, No. 2.

Experiment: Effect of pounding on a magnet. Science Activities, Book 2, page 141, No. 3.

Demonstration: The magnetic field about a magnet. Science Activities, Book 2, pages 142, 143.

Experiment: The dipping needle. Science Activities, Book 2, page 144.

Demonstrations:
1. Comb drawn through hair will pick up paper.
2. Comb rubbed on a wool sweater—same result.
3. Scuff feet on a wool rug—touch another person or metallic object.
4. Using an ebonite rod and cat's fur, or a glass rod and silk, note the effect on small scraps of paper, sawdust, etc.
5. Paper doll experiment.

Experiment: Different kinds of electrical charges and the law of electrical charges. Science Activities, Book 2, page 160.

Demonstration: The pith-ball electroscope. Science Activities Book 2, page 162.

Experiment: Distinguishing between conductors and insulators. Science Activities, Book 2, page 164.

Experiment: Is there a magnetic field about a wire carrying an electric current? Science Activities, Book 2, page 168.

Demonstration: Using a magnet to cause a flow of electricity. Science Activities, Book 2, page 169.

Demonstration: Making an electro-magnet. Science Activities, Book 2, page 171.

With the above magnet (1) vary the number of turns of wire. (2) vary the strength of the current.

Check polarity with a compass and the left-hand rule.

Demonstration: Construct a simple voltaic cell. Science Activities, Book 2, page 184.

Experiment: The electric circuit.

Connect an electric bell to two dry cells. Science Activities, Book 2, page 186.

Experiment: Two or more voltaic cells in series. Science Activities, Book 2, page 189.

GRADE VIII – UNIT III

THE SOLAR SYSTEM

References:

T. W. Hunt et al: *Science Activities, Book 2,* W. J. Gage

J. E. Adair et al: *Science Discovery and Progress,*
Clarke, Irwin & Co.

F. D. Curtis & G. G. Mallinson: *Science in Daily Life,*
Ginn & Co.

Basic Science Ed. Series: *Beyond the Solar System,*
Copp Clark Publishing Co.

Basic Science Ed. Series: *The Sun and Its Family,*
Copp Clark Publishing Co.

E. S. Obourn et al: *Science in Everyday Life,*
Van Nostrand

G. O. Blough & A. J. Huggett: *Elem. School Science—How To Teach It,* Dryden Press

March of Science: *Earth and Universe,*
Thomas Nelson & Sons
The Sky Above Us

Basic Science Ed. Series: *Earth's Nearest Neighbor,*
Copp Clark Publishing Co.

American Map Co. Inc.: *Solar System,*
Clarke, Irwin & Co.
(This is a large wall chart)

Filmstrips:

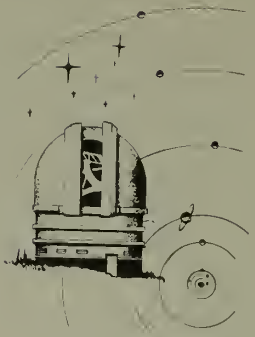
A Multitude of Suns, Jam Handy P-251
The Sun's Family, Jam Handy, P-253
The Solar System, Y.A.F., Pk-2943
Our Earth is Moving, Jam Handy, Pk-2194
Earth and the Universe, S.V.E.
Our Neighbor, The Moon, Jam Handy, P-255
The Changing Moon, Y.A.F., P-256
Interesting Things About Planets, Jam Handy, P-254

Apparatus:

Prism
water jar
classroom globe
flashlight

UNIT III

THE SOLAR SYSTEM



Content	Suggested Treatment
I. Early Ideas About the Universe	Have pupils report on early theories about the heavens. Report on the meaning of astronomy and astrology. Study early instruments for observation of the sky and its bodies. Report on Ptolemy, Copernicus, Galileo, Lippershey. Discuss modern instruments for observation of the heavens.
II. Present Ideas About the Solar System	How do we know that there are many solar systems of which ours is only one? Teach the meaning of sun, planets, moons, meteors, asteroids, comets, etc. Enrichment Suggestions: **(1) Examine a chart on Astrology.** **(2) Examine the parts of a telescope. How does it work?**
III. The Sun	Make a diagram of our Solar System to scale. The sun as our source of energy (heat, light, electrical, chemical, etc.), distance from the earth, temperature, rotation on its axis and movement through space. Make a diagram tracing various forms of energy back to the sun. Discuss sun spots and their influence on the earth. Experiment: Use a prism to break sunlight into colors. (Note order of same.) A projector provides a good source of light and gives excellent results. Experiment: Pass sunlight through a rectangular jar of water, and note spectrum. Discuss and show by diagram, primary rainbows. Note order of colors. **Enrichment Suggestions: Set up a scale model of the solar system on the playground showing relative distances and sizes.** **Read from:** **All about the Stars, (White) Hale Company.** **The Conquest of Space, (Bonestell-Ley) MacMillan.** **When the Stars Come Out, (Baker) MacMillan.** **Visit the Observatory, U. of A.**
IV. The Earth Revolution Rotation Tilt of axis Causes of day and night Weather in summer and winter Seasons Lengths of day and night in different latitudes Longitude and latitude	Report on the diameter and circumference of the earth at the equator. Using a globe, show that the earth revolves about the sun, rotates on its axis which is tilted at 23½° with respect to its plane of rotation. Note that the period of rotation is 23 hours, 56 minutes. Experiment: To show how day and night occur using a globe and a flashlight or a projector for a better source of light. Experiment: Does a vertical ray of light cover less area than a slanted ray? Experiment: Does a vertical ray of light produce more heat per unit area than a slanted ray? Experiment: Use a globe and a flashlight or a projector for a better source of light to show how the length of the day changes through the year. Explain why there are seasons, equinoxes, solstices.

UNIT III

THE SOLAR SYSTEM

Aids and References	Understandings and Generalizations
Encyclopaedia *Science in Daily Life*, pp. 207, 214 *Science Activities, Book 2*, pp. 242-244	Some early concepts of the universe were well thought out, but differ a great deal from what we now know to be true.
Beyond the Solar System, pp. 3-10 *Science in Daily Life*, pp. 241-242, 245 *Solar System*, (Wall chart)	The solar system consists of the sun and all the objects revolving about it.
Science: Discovery and Progress, pp. 204, 205 *The Sun and Its Family*, p. 12 *Science in Daily Life*, p. 219 *Science Activities, Book 2*, pp. 245-247 *The Sun and Its Family*, p. 8 *Science in Daily Life*, pp. 239-241 *Elementary Science—How to Teach It*, pp. 135, 154 *The Sun and Its Family*, p. 7 *Science in Daily Life*, p. 240 *Science in Everyday Life*, p. 325 *Science Activities, Book 2*, p. 221 *Elem. Science—How to Teach It*, p. 155 *Science: Discovery and Progress*,pp. 258, 259 *Science in Daily Life*, p. 182	
Filmstrips: *A Multitude of Suns* *The Sun's Family* *The Solar System* *Our Sun*	
	The sun is the center of our solar system and affects us in many ways.
Science Activities, Book 2, pp. 247-255 *The Sun and Its Family*, pp. 16-18 *Elem. School Science—How to Teach It*, p. 156 *March of Science—Earth and Universe*	
Elem. School Science—How to Teach It, p. 158 *Science: Discovery and Progress*, pp. 219-229 *Science in Daily Life*, pp. 226-228	
March of Science—Earth and Universe *Science in Daily Life*, pp. 222-228 *Science in Daily Life*, p. 226	

UNIT III

THE SOLAR SYSTEM

Content	Suggested Treatment
	Explain why some sunsets are different from others. Explain twilight, blueness of the sky, why stars are not seen in daytime, solar time, standard time, and how to tell directions.
	Enrichment Suggestion: **Read from: All about the Stars.** Make a planetarium showing some of the constellations and their relationships to one another.
V. The Moon Our Nearest Neighbor	Discuss using diagrams, pictures and filmstrips. (a) Size of moon. (b) Distance from earth. (c) Conditions of the moon.
Rotation and revolution Phases	Explain rotation, revolution and phases of the moon by demonstrating with a source of light and globes. Make diagrams.
Eclipses (Solar and Lunar)	Demonstration—show how eclipses take place using a source of light and two globes.
	Enrichment Suggestions: **Reading—Conquest of the Moon—Von Braun (MacMillan).** **Do tides occur in the earth's crust and the earth's atmosphere?** **Why do tides vary from place to place and from time to time?** **What is sea level?**
VI. The Planets	Develop a chart showing order, distances from sun, size, revolution, rotation, number of satellites. Report on each planet. Locate in the heavens as many planets as possible.
VII. Astronomy and the Stars	Calculate the number of miles in one light year. Study and try to locate the north star and the following constellations: Ursa Major—The Great Bear, the Big Dipper. Ursa Minor—The Little Bear, the Little Dipper. Orion (The Hunter). Cassiopia (The Woman in the Chair). Canis Major (The Great Dog). Canis Minor (The Little Dog). Taurus (The Bull). The Pleiades. The Hyades.

UNIT III

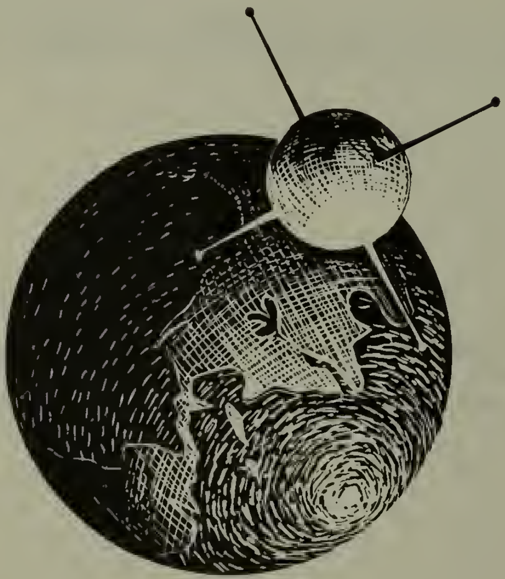
THE SOLAR SYSTEM

Aids and References	Understandings and Generalizations
The Sun and Its Family, pp. 16-18 *Elem. School Science—How to Teach It,* p. 157 *The Sky Above Us,* pp. 3-9 *Science: Discovery and Progress,* pp. 224-228 Filmstrips: *Our Earth is Moving* *The Earth and the Universe* *Elem. School Science—How to Teach It,* p. 159	We are affected by the rotation of the earth on its axis, and its revolution about the sun.
The Earth's Nearest Neighbor, pp. 3-14 Filmstrips: *Our Neighbor, The Moon* *The Moon* *Science Activities, Book 2,* pp. 255-263 *Science in Daily Life,* pp. 228-233 *Science in Everyday Life,* p. 332 *Elem. School Science—How to Teach It,* p. 161	
Science in Daily Life, p. 230 *The Earth's Nearest Neighbor,* pp. 15-23 *Science in Everyday Life,* pp. 333, 334	
Science in Daily Life, pp. 231, 232 *The Earth's Nearest Neighbor,* pp. 27-36 *Elem. School Science—How to Teach It,* p. 164 *Elem. School Science—How to Teach It,* p. 163 *Science in Everyday Life,* p. 335 *Science: Discovery and Progress,* p. 231	The moon is an earth satellite, and influences the earth through its gravity and reflected light.
Science Activities, Book 2, pp. 263-268 *Science in Daily Life,* p. 209 *Science in Everyday Life,* pp. 327-331 *The Sky Above Us,* pp. 26-29 *The Sun and Its Family,* pp. 8-27 *March of Science: Earth and Universe* Filmstrips: *The Sun's Family* *Interesting Things About the Planets*	There are at least nine planets revolving about the sun; several of these have moons or satellites of their own.
Science Activities, Book 2, pp. 268-279 *Beyond the Solar System* *The Sky Above Us,* pp. 15-26 *Science in Everyday Life,* pp. 248-351 *Science in Daily Life,* pp. 242-246 *Star Maps*	Constellations are groups of stars that have been named. The unit of measurement of sky distances is the light year.

UNIT III

THE SOLAR SYSTEM

Content	Suggested Treatment
VIII. The Smaller Objects in the Solar System	Reports and diagrams to illustrate asteroids, meteors, fire balls, "shooting stars", comets, meteorites and planetoids. Study the importance of the pole star and how stars are used as a basis of time. Report on the American and Russian satellite programs.
IX. Stars of Many Kinds	**Enrichment Suggestions:**
	Reading from:
	When the Stars Come Out, (Baker) MacMillan..
Star Dwarfs, Star Giants and Double Stars	**Looking at the Stars, (Ovenden) Dent.**
Novae	**The Conquest of Space, (Bonestell-Ley) MacMillan.**
The Milky Way (Star City)	**Introducing the Constellations, (Baker) MacMillan.**
Nebulae	
Galaxies	Discuss:
	Star Dwarfs, Star Giants and Double Stars Novae The Milky Way (Star City) Nebulae Galaxies
X. Artificial Satellites and Looking to the Future.	Discuss man's attempt to probe space.



UNIT III

THE SOLAR SYSTEM

Aids and References

Science Activities, Book 2, pp. 279-288
Science in Everyday Life, pp. 331, 336-338
The Sun and Its Family, pp. 27, 36
Science in Daily Life, pp. 216, 221

Understandings and Generalizations

There are other objects besides the sun, planets and moons in our solar system.

The study of astronomy is becoming more important to man.

Artificial satellites are sent up to find out more about space.

The study of astronomy may reveal the origin and destiny of our planet.

SUMMARY OF EXPERIMENTS FOR UNIT III

THE SOLAR SYSTEM

Demonstration: Using a prism to break light into colors. Science Activities, Book 2, pages 245-246.

Demonstration: Day and night. Science Activities, Book 2, page 248.

Demonstration: Vertical and slanted rays of light. Science Activities, Book 2, page 250.

Demonstration: Change in length of day. Science Activities, Book 2, pages 250-252.

Demonstration: Cause of the Seasons. Science Activities, Book 2, pages 252-254.

Demonstration: Demonstrating phases of the moon. Science Activities, Book 2, page 259.

Demonstration: An eclipse of the sun. Science Activities, Book 2, page 261.

Demonstration: An eclipse of the moon. Science Activities, Book 2, page 262.

Demonstration: Relations—distance between sun and planets, size, etc. Science Activities, Book 2, pages 262-266.

Demonstration: Constellations. Science Activities, Book 2, pages 270-274.

GRADE VIII – UNIT IV

WEATHER

References:

T. W. Hunt, et al: *Science Activities, Book 2,* W. J. Gage

F. L. Namowitz: *Earth Science, Book 2,* Van Nostrand

V. C. Smith and W. E. Jones: *Enjoying Modern Science,* Longmans Green

Basic Science Ed. Series: *Ways of the Weather,* Copp Clark

Filmstrips:

Humidity, Jam Handy, P-1075

Fluids, Barometers and Weather, Jam Handy, P-388

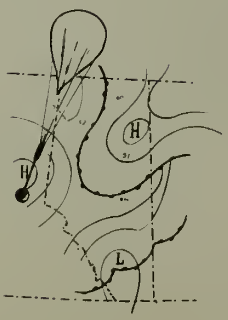
Apparatus:

- Test tubes
- glass tubing
- barometer tube and well
- mercury
- rubber tubing
- convection apparatus
- thermometers
- meter stick
- bell jar, base and pump
- basketballs
- milk bottle
- can with screw top
- aneroid barometer

UNIT IV

WEATHER

Content	Suggested Treatment
I. Weather Differs from Climate Weather Climate Types of climate Weather and climate affect our activities	Write immediately for weather maps (See page 323 of Science Activities, Book 2). Listen to weather reports and list the factors mentioned. (Employees at the local Meteorlogical Station will often come and speak to classes.) Describe summer and winter climate for your area or selected areas. Form definitions of weather and climate. Compare accomplishments of peoples living in climatic extremes with those of peoples in temperate countries. Discuss briefly various activities, and explain how they are affected by weather and climate.
II. Air Pressure and Weather Air pressure High and low pressure areas	Experiment: Air occupies space. Experiment: To show air has weight. Experiment: Air exerts pressure. Reading and Research: Mercury and aneroid barometers. Construction of a mercury barometer. Reading and Research: High and low pressure areas—air movements. **Enrichment Suggestions:** **A school weather station—planning, etc.** **Checking the Weatherman.** **Effect of Altitude on Air Pressure.** **Other Uses of Barometers.** **Layers in the Atmosphere.**
III. Winds and Weather	Diagram and Research: Wind belts of the earth. Experiment: To show effects of unequal heating on air. Reading and Report: How heat is distributed by winds (land and sea breezes).



UNIT IV

WEATHER

Aids and References	**Understandings and Generalizations**
Science Activities, Book 2, pp. 290-296	
	Climate affects our way of living.
Science Activities, Book 2, pp. 290-291	
Earth Science, Book 2, Chapters 14-18	
Enjoying Modern Science, Unit V	
Science Activities, Book 2, pp. 296-303	
Earth Science, Book 2, Chapter 3	The position of high and low pressure areas affect air movements.
Earth Science, Book 2, Chapter 1 *Earth Science, Book 2,* page 38	
Earth Science, Book 2, pages 44-49 *Enjoying Modern Science,* pages 322-325 *Science Activities, Book 2,* pp. 303-309	Convection and earth rotation affect weather.

UNIT IV

WEATHER

Content	Suggested Treatment
IV. Water Vapor and Weather (a) Dew and hoar frost (b) Relative humidity	Experiment: To show that there is water vapor present in the air. Discussion and Summary: Formation of dew and hoar frost. How moisture gets into the air. Experiment: To show that substances evaporating absorb heat. Construction of a wet and dry bulb hygrometer. Reading relative humidity tables. Discuss effect of relative humidity on health. **Enrichment Suggestions:** **Beaufort Scale and Symbols.** **Monsoon, mountain and valley breezes.** **Lag effects.**
V. Clouds and Weather (a) Cloud formation (b) Types of clouds (c) Rain, snow and hail	Experiment: To show water vapor condenses on a cold surface. Experiment: To show saturation (variations with temperature). Discussion and Summary: Effects of temperature on water holding capacity of the air. Cloud formation: Vapor condensing on a surface. How rain, snow and hail are formed. Examination of hailstones for structure. Observation and Classification of a few cloud types. Diagrams.
VI. Weather Forecasting (a) Instruments used (b) Symbols on weather charts (c) Setting up of forecasts	Examination of weather maps: Listing and identification of information. Reading and Report: Movement of air masses. Instruments used in forecasting. Construction of simple instruments. Reading and Report: Construction of weather charts and setting up of forecasts. Uses of weather forecasts.

UNIT IV

WEATHER

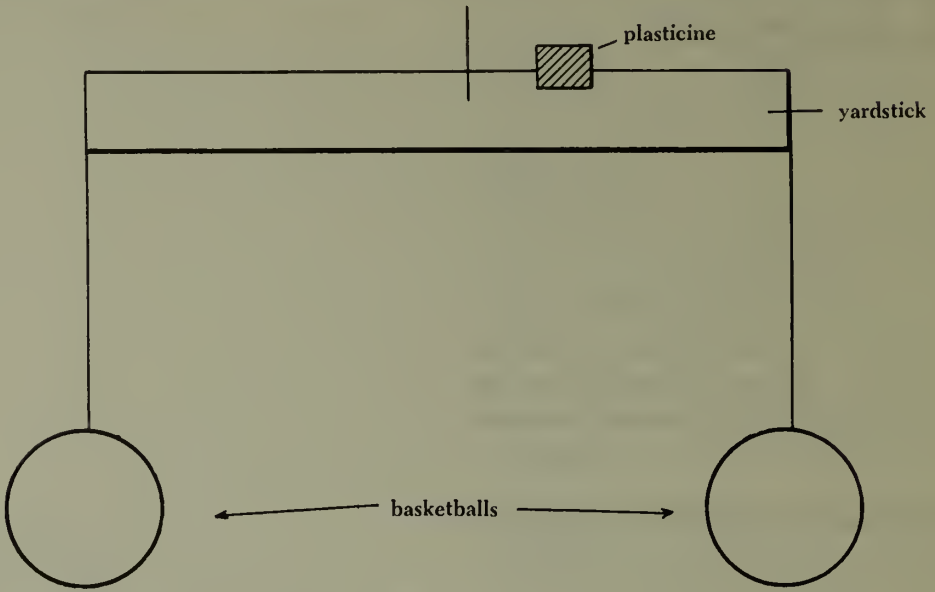
Aids and References	Understandings and Generalizations
Earth Science, Book 2, pp. 61-62 *Enjoying Modern Science,* p. 320 *Science Activities, Book 2,* pp. 309-313 *Earth Science, Book 2,* Chapter 5	Water vapor is present in the air.
Earth Science, Book 2, p. 53	
Science Activities, Book 2, pp. 313-322	
	Water vapor collects in clouds and is precipitated as rain, snow or hail.
Earth Science, Book 2, p. 63	
Earth Science, Book 2, pp. 64-66 *Earth Science, Book 2,* Chapters 6-10	
Science Activities, Book 2, pp. 323-342 *Science Activities, Book 2,* for instruction re obtaining. (Materials may be also obtained from your local weather station)	

SUMMARY OF EXPERIMENTS FOR UNIT IV

WEATHER

Experiment: Does air occupy space? (see text page 296.)

Experiment: Does air have weight? (the following is suggested as an alternate to the text method.)



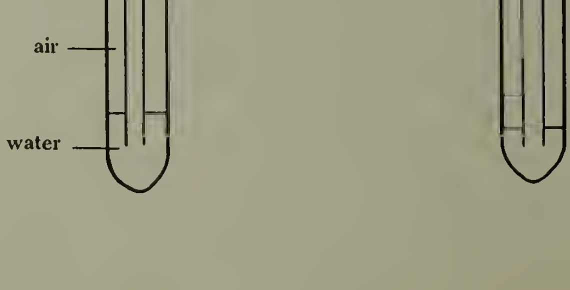
Secure string firmly to two basketballs using Scotch tape or electricians tape and attach one to each end of a metre or yardstick. Inflate fully. Suspend yardstick from centre, and use a plasticine rider to bring system into balance. Allow air to escape from one ball (**do not squeeze out of shape**). Note effect on balance.

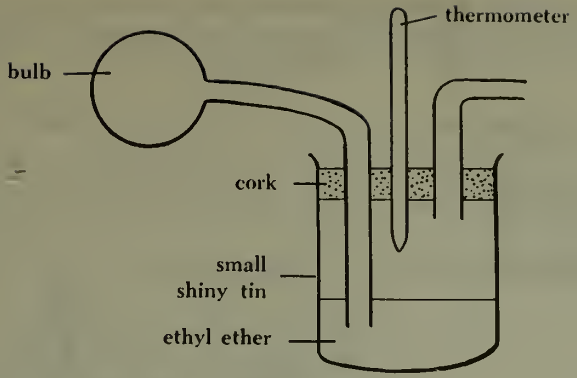
Experiment: Does air exert pressure? Activities No. 1 to 6, on page 298, Science Activities, Book 2.

Note: In activity No. 4 it is important that the flask be completely full of water and that the whole assembly fit snugly.

Demonstration: Insert a small, partially filled balloon in a bell jar and pump out the air.

Note: The balloon will burst if pumping is continued. Note effect on loudness of sound.





Experiment: Do evaporating substances absorb heat?
Pour a drop or two of ether on the hand and allow to vaporize.
Note cooling effect.

Experiment: Moisten base of a watch glass with water and place on a board.
Partly fill glass with ether and fan vigorously.
Unless the room is particularly warm the glass can usually be frozen to the board.
The same effect can usually be obtained by placing the apparatus in the bell jar, and using the pump to reduce air pressure.

Experiment: To show that water vapor condenses on a cold surface.
Science Activities, Book 2, page 309.

Tumbler and ice water could be used in place of tin.
Use several different surfaces: tin, glass, plastic, etc.

Demonstration: Saturated solution.
Science Activities, Book 2, page 314.

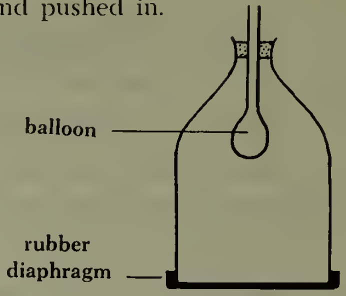
Note: Once the point of saturation has been reached, the effects on saturation of heating or cooling the solution might be attempted. If a group has been working on the Dew Point, the relation of temperature to water holding capacity could be dealt with in that connection.

Demonstration: Insert siphon system as shown in a bell jar and let stand until water stops flowing. Pump out the air and note the direction of water flow. Note that the flow is reversed when the air is let back into the jar.

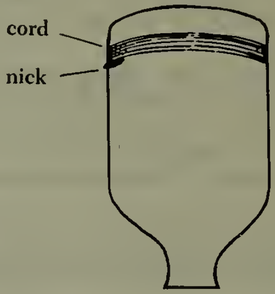
Note: Some of the better students, by using a scale attached to the corked tube, may be able to determine what portion of the air was removed.

II. Using an old vinegar bottle with the bottom removed, it is possible to set up an apparatus to demonstrate breathing. See diagram.

Breathing effect can be seen as diaphragm is pulled out and pushed in.



Note: To remove bottom of bottle, nick with file and wrap cord around bottle where break is desired. Soak cord with wood alcohol and light (bottle should be upside down). Plunge into cold water.



Experiment: Convection currents (see text page 304).

Note: A rag soaked in oil will often give a smoke that is easier to see.

Experiment: Is water vapor present in the air? See page 186, Science Activities, Book 2.

Note: If a dew point apparatus is available (or a small, shiny tin and an atomizer bulb) advanced students may be interested in finding the dew point on several different days.

Experiment: Into a polished tin, pour ethyl ether to a depth of about half an inch. Pump air through the ether rapidly until a film of moisture appears on the outside of the tin. Note temperature at which vapor first appears on tin, then stop pumping and note temperature at which vapor disappears. Average of the two should give the Dew Point.

Why is the Dew Point much lower during a dry spell?

GRADE VIII — UNIT V

DOMESTIC ANIMALS

References:

T. W. Hunt et al: *Science Activities, Book 2,*
W. J. Gage

Special Notes:

In connection with this chapter, it is advisable and desirable to solicit the assistance of local experts such as District Agriculturists, Dominion Experimental Farm employees, Master Farmers, poultrymen, etc. whenever possible.

Teachers should write to both Provincial and Federal Departments of Agriculture and Curriculum Branch, Department of Education, Edmonton, for illustrative material and information.

Please note: Teachers only may obtain such materials and these are supplied only in single lots for classroom use.

Filmstrips:

Canadian Beef Cattle, P-1704 (N.F.B.)
Heredity and Environment, P-2970 (Y.A.F.)
Heredity, P-1421 (E.B.F.)

UNIT V

DOMESTIC ANIMALS

Content	Suggested Treatment
I. Using and Improving Domestic Animals A. Uses of livestock	Field trips should prove useful in connection with this unit. Discuss the general importance of farm animals to man. List the many ways in which farm animals are useful.
B. Improvement of livestock by domestication	Discuss the history of many of the animals used on the farm today, emphasizing the important differences between present forms and their ancestors. Discuss the development of types of livestock for special purposes. What do we mean by purebreds? By grades?
C. Improvement by selection	Discuss the ways in which the members of a species vary from one another, and the fact that this gives farmers a basis for the selection of animals with specific desirable characteristics.
D. Improvement by scientific breeding	Discuss the reasons why offspring are often superior to either parent. Report on the principles of cross-breeding and its advantages.
II. Cattle A. Dairy cattle	Discuss the characteristics of good dairy cattle. List the breeds of dairy cattle in common use in Alberta today. Report on the importance of the dairy industry to Canada.
B. Production of beef	Discuss the characteristics of good beef cattle. List the breeds of beef cattle in common use in Alberta today. Report on the importance of the beef industry to Alberta and to Canada. Discuss the importance and use of dual-purpose cattle in Alberta. **Enrichment Suggestion: Prepare a report on the experiment with cattle at the Manyberries Range Station in Southern Alberta.**

UNIT V

DOMESTIC ANIMALS

Aids and References	Understandings and Generalizations
Science Activities, Book 2, pp. 344, 345	Farm animals are valuable to our economy.
Science Activities, Book 2, pp. 345-349	
Science Activities, Book 2, pp. 349-351	
Science Activities, Book 2, pp. 351-353	Domestic animals are constantly being improved.
Science Activities, Book 2, pp. 354-357	
Science Activities, Book 2, pp. 364-367	Cattle are becoming increasingly important in the utilization of grain products.

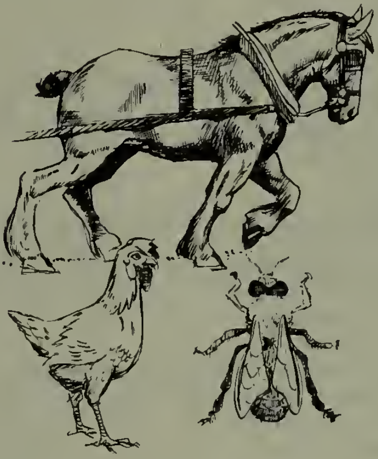
UNIT V

DOMESTIC ANIMALS

Content	Suggested Treatment
III. Livestock for Power, Fibre and Food A. Horses 1. Draft horses 2. Light horses	Contrast draft horses and light horses as to chief characteristics and use. Try to assess the place of the horse in modern living. List the main breeds of horses still in use in Alberta. **Enrichment Suggestions: Trace the development of the horse from its earliest fossil records in North America.** **Try to assess the importance of the horse and its relatives in the growth and development of civilization. Summarize this material in a chart.** **How did the North American Indian happen to have wild horses available?**
B. Sheep	Discuss the economic importance of sheep in Canada. List the main breeds in use here today. **Enrichment Suggestion: Prepare a report on the development of the Harvey-cross of Rombouillet and Romney Marsh.**
C. Pigs	Discuss the importance of the swine industry to our economy. List the main breeds in use in Alberta today. **Enrichment Suggestion: Prepare a report on the development of the Lacombe hog.**
D. Poultry	Report on the value of the poultry industry to Alberta and to Canada. Discuss the main breeds of poultry in use in Canada today. **Enrichment Suggestion: Find out as much as you can about the development of domestic breeds of hens from their wild ancestor, the jungle fowl.**
E. Honey-bees	Discuss the importance of bee-keeping in Canada. Study about the interesting organization of the bee-hive. List a dozen special adaptations of the bee to its way of life. **Enrichment Suggestion: Find out about the life history of this remarkable insect.**

UNIT V

DOMESTIC ANIMALS

Aids and References	Understandings and Generalizations
Science Activities, Book 2, pp. 367-371	In this mechanized age, the draft horse is being rapidly replaced, but the lighter breeds continue to be important for show and recreation uses.
Science Activities, Book 2, p. 371	
Science Activities, Book 2, pp. 371-373	
Science Activities, Book 2, pp. 374-376	Farm animals contribute to our economy in many different ways.
Science Activities, Book 2, pp. 379-383	

LIST OF APPARATUS EQUIPMENT AND CHEMICALS FOR THE JUNIOR HIGH SCHOOL SCIENCE LABORATORY

A—BASIC MATERIAL

1. Equipment

Glassware:
Test tubes
Beakers
Funnels
Flasks
Glass Tubing
Graduates
Thistle Funnels
Watch Glasses

Bunsen or Alcohol Burners
Support Stands
  Rings
  Burette Clamps
Test Tube Brushes
Spring Balance
Balance and Weights
Cork Borers (set)
Stoppers
  Rubber
  Cork
Test Tube Racks
Pneumatic Trough
Filter Paper
Litmus Paper
Rubber Tubing
Iron Wire Gauze
Mortar and Pestle
Crucible Tongs
Prisms
Glass squares 4" x 4"

2. Chemicals

Acids—HCl, H_2SO_4, HNO_3
Sodium Chloride
Calcium Carbonate
Calcium Hydroxide
Potassium Chlorate
Manganese Dioxide
Copper Sulphate
Sodium Bicarbonate
Mercury
Iodine (tincture)
Alcohol (denatured)
Alum
Iron Filings (fine)
Starch
Fehling's Solution

3. Tools Required For Laboratory

Hammer
Screw Driver
Pliers, regular
Pliers, long nosed
Triangular File

B—SPECIAL MATERIAL FOR GRADE VII

Osmosis apparatus
Magnifiers
Microscope
Clay triangles
Crucibles
Evaporating dishes
Liebig condenser
Capillary tubes
Labels (gummed)
Rock and Mineral Collection

Ordering instructions:

(a) Bureau of Geology and Topography, Ottawa
Collection No. 4 Mineral chips (.50)
Rock chips (.50)

(b) Alberta and North-West chamber of Mines,
10060-100 Street, Edmonton
Rocks—collection of 36—$1.50
Minerals—collection of 35—$1.50
Note—shipping charges are extra

C—SPECIAL MATERIAL FOR GRADE VIII

Aquarium
Microscope Slides—Protozoa, Bacteria
Barometer Tube
Barometer Well
Bell Jar, bell jar base, pump
Convection current apparatus
Thermometers—Centigrade and Fahrenheit
Magnetite
Bar magnet—steel
Bar magnet—alnico
Horseshoe magnet
Blueprint paper
Compass
Dipping needle
Pith Balls
Ebonite rod
Cat skin
Glass rod
Electroscope (gold leaf)
Dry cells
Copper wire—cotton covered—No. 24
—enamelled—No. 24
Copper and zinc strips 5"x 1"
Galvanometer
Doorbell
Electric motor (St. Louis demo.)
Electromagnet
Miniature sockets and bulbs
Knife switch
Battery jar
Nichrome wire
Fuse wire
Telegraph key and sounder
Telephone model
Voltammeter
Coil (primary—secondary)
Insect pins
Insect Killing Bottle

Enrichment Reading List

The list below gives just a few of the many enrichment books suitable for junior high school science. The titles listed are suggestive only and are given to assist those teachers who have not the time nor the facilities to seek out enrichment materials on their own.

The books may be purchased directly from the publishers listed, or by special order from the School Book Branch.

Price range—less than $1.00

Haworth:

Aquaria
Clarke, Irwin and Company, Toronto

Sutherland et al:

Webster Classroom Science Library
Let's Read About Insects
Let's Read About Birds
Let's Read About Fishes
Let's Read About Rocks and Minerals
Let's Read About Stars
Let's Read About Sea Shells
Let's Read About Butterflies
Let's Read About Prehistoric Animals
Let's Read About Flowers
Let's Read About Reptiles and Amphibians
Let's Read About Trees
Let's Read About Mountains and Volcanoes
Let's Read About Airplanes
Let's Read About Jungle Animals
Let's Read About Space Travel
Let's Read About The Sea
Let's Read About The Earth
Let's Read About Unusual Birds
Longmans, Green & Company, Toronto

Price range—$1.00 to $3.00

Fenton:

Riches From The Earth
Longmans, Green & Company, Toronto

Graham and Van Dersal:

Water For America
Oxford University Press
480 University Avenue, Toronto 2

Hood:

Observing The Heavens
Oxford University Press
480 University Avenue, Toronto 2

Neurath:

Inside The Atom—Max Parrish, London
Clarke, Irwin and Company Limited
791 St. Clair Avenue West, Toronto 10

Dickinson:

The First Book of Prehistoric Animals
Franklin Watts
New York (Grolier Society)

Mae and Ira Freeman:

Fun With Science
School Book Branch

Pratt:

Canadian Portraits—Famous Doctors
Banting, Osler, Penfield
Clarke, Irwin and Company, Toronto

Shaw:

Canadian Portraits—Geologists and Prospectors
Tyrrell, Camsell, Cross, Labine
Clarke, Irwin and Company, Toronto

Jensen:

My Hobby Is Collecting Rocks and Minerals
Children's Press, Chicago

Bruno Frost:

Prehistoric Animals
Maxton Publishers, Inc., New York
Jack Hood School Supplies, Stratford, Ontario

Ovendon:

Looking At The Stars
J. M. Dent and Company, Toronto

Stoiko, Cox:

Man—In The Universe
John C. Winston, Toronto

Price range—$3.00 to $5.00

Gamow:

The Moon
Nelson, Foster and Scott Limited
87 John Street, Toronto 2B

John and Jean George:

Meph, The Pet Skunk
Vulpes, The Red Fox
Masked Prowler, The Story of A Racoon
Bubo, The Great Horned Owl
Vison, The Mink
Book Society of Canada
4386 Sheppard Avenue East, Agincourt

Julian Huxley:

The Wonderful World of Life
Garden City Books
Garden City, New York
Doubleday Canada Limited
105 Bond Street, Toronto 2

James Fisher:

The Wonderful World of Air
Garden City Books
Garden City, New York
Doubleday Canada Limited
105 Bond Street, Toronto 2

Spilhaus:

Satellite of the Sun—Viking Press, New York
MacMillan Company of Canada Limited
70 Bond Street, Toronto 2

Shippen:

The Bright Design
MacMillan Company of Canada Limited
70 Bond Street, Toronto 2

Baker:

When The Stars Come Out
MacMillan Company of Canada Limited
70 Bond Street, Toronto 2

Baker:

Introducing The Constellations
MacMillan Company of Canada Limited
70 Bond Street, Toronto 2

Gallant:

Planets
Chemistry
Sun
Exploring The Weather
Garden City Books
Garden City, New York
Doubleday Canada Limited
105 Bond Street, Toronto 2

Price range—over $5.00

Scheele:

Prehistoric Animals
World Publishing Company, New York

Ahnstrom

Jets and Rockets
Nelson, Foster and Scott, Limited
87 John Street, Toronto

Rush, Chambliss, Gimpel:

The Complete Book of Submarines
Nelson, Foster and Scott, Limited
87 John Street, Toronto

Ahnstrom:

The Complete Book of Helicopters
World Publishing Company, New York

Price not known

Cosgrove:

Wonders Under A Microscope
Dodd, Mead and Company, New York

Riedman:

Water For People
Nelson, Foster and Scott, Limited
87 John Street, Toronto

Sand Hog
(Way of Life of the Tunnel Builders)
Jack Hood School Supplies
Stratford, Ontario

Bonestell-Ley:

The Conquest of Space
MacMillan Company of Canada Limited
70 Bond Street, Toronto 2

Braun:

Conquest of the Moon
MacMillan Company of Canada Limited
70 Bond Street, Toronto 2

Tannehill:

All About The Weather
Random House

Freeman:

All About Electricity
E. N. Hale and Company

Filmstrip List and Publishers

Aust. H. Comm.

1. Our Earth
2. Platypus

Australian High Commissioner's Office
10 Sparks Street
Ottawa 4, Ontario

B.I.F.

Prehistoric Monsters

British Instructional Films
Film House
Waldour Street
London, W. 1, U.K.

C.G. (Common Ground)

1. Earthworms
2. Growth and Metamorphosis of the Frog
3. Protozoa
4. The Telephone

Rank Film Distributors
571 Victoria Street
Toronto, Ontario

Curriculum

1. About Our Earth
2. Animals of Long Ago
3. Birds of Lake and Marsh
4. Conserving Our Forest Resources
5. Conserving Our Soil Resources
6. Conserving Our Water Resources
7. Feathered Friends of the Lakeside
8. Grouse: Their Homes and Habits
9. How Living Things Respond
10. Our Changing Earth
11. Our Gnawing Animals
12. Our Hawks
13. Our Hoofed Animals
14. Our Owls
15. Our Very Friendly Birds
16. Parts of a Flowering Plant
17. Visits to Gull Island

Johnson Bros. Educational Films and Records
5512 - 20 Ave. N.W.
Seattle 7, Washington, U.S.A.

Daily Mail

1. The Dandelion
2. Drama of the Clouds
3. Reproduction in the Plant Kingdom

Daily Mail School
School Aid Department
New Carmelite House
London, E.C. 4

Dowling

1. Conserving Water and Soil
2. Hawaiian Islands
3. How Trees Grow
4. Water Cycle

Pat Dowling Pictures
1056 S. Robertson Boulevard
Los Angeles 35
California, U.S.A.

E.B.F.

1. Animal Life and the Soil
2. Atmosphere and Its Circulation
3. Atmospheric Pressure
4. Discovering Fossils
5. Elements of Electrical Circuits
6. Fresh Water Turtles and Fish
7. Heredity
8. Home Electrical Appliances
9. How Man Conserves the Soil

Encyclopaedia Britannica Films Inc.
978 Queen's Way
Toronto, Ontario

10. How Man Conserves the Soil
11. How Man Has Used the Soil
12. How Soil Was Formed
13. Keeping An Aquarium
14. Minerals in the Soil
15. Plant Life and the Soil
16. Story of Air, The
17. Story Fossils Tell, The
18. Story of Ice and Glaciers, The
19. Story of Mountains, The
20. Story of Underground Water, The
21. Story of Volcanoes
22. Water and the Soil
23. Water We Drink, The
24. Weather

E.G.H. (Eye Gate House)

1. Latitude, Longitude and Time
2. Luther Burbank, Plant Wizard
3. Water
4. World of Clouds, The

Eye Gate House
Ryerson Film Service
299 Queen Street West
Toronto, Ontario

G.B.I. (Gaumont British Instructional)

1. Latitude and Longitude
2. Longitude and Time
3. Photosynthesis

Gaumont British Instructional
J. Arthur Rank Distributors
277 Victoria Street
Toronto, Ontario

Hulton

1. Earth's Crust, The
2. Pollination
3. Work of Ice, The
4. Work of the Rivers, The
5. Work of the Weather, The

Hunton Press Ltd.
43-44 Shoe Lane
London E.C. 4, England

J. Handy (Jam Handy)

1. Applications of Electricity, Parts I and II
2. Barometers and the Weather
3. Changing Moon, The
4. Climate
5. Current Electricity
6. Earth is Changing, The
7. Electric Cell, The
8. Electromagnetism
9. Helping Birds
10. Humidity
11. How We Think Our Earth Came To Be
12. Interesting Things About Planets
13. Magnetism
14. How Rocks Are Formed
15. Soil, The
16. Static Electricity
17. Storage Battery
18. Story of Earth We Find in Rocks, The
19. Our Earth in Motion
20. Our Insect Enemies and Friends
21. Our Neighbor, The Moon
22. What Makes Weather
23. What Weather Is

Jam Handy Company
2821 East Grand Boulevard
Detroit, Michigan

Life

1. Age of Mammals, The
2. Earth is Born, The
3. Face of the Land, The
4. North American Moose, The
5. Reptiles Inherit the Earth
6. Weather

Life Magazine Incorporated
9 Rockefeller Plaza
New York 20, N.Y.

N.F.B. (National Film Board)

1. A.B.C. of Gardening
2. Barren Ground Cariboo, The
3. Beaver, The
4. Canada Goose, The
5. Canadian Beef Cattle
6. Common Loon, The
7. Dinosaurs
8. Electrical Hazard
9. Frog, The
10. Grasshopper
11. Little Brown Bat
12. Native Trees of Canada
13. North American Moose, The
14. Smaller Land Mammals (Rodents)
15. Smaller Land Mammals (Moles, Shrews and Rabbits)
16. Smaller Land Mammals (Flesh Eaters)

National Film Board
South Side Post Office
Edmonton, Alberta

Ohio State

Geology: Study of the Earth and Forces Acting On It, P-2917

Teaching Aids Laboratory
College Road Annex
Ohio State University
Columbus 10, Ohio

P.S.P.

1. Changes in Weather
2. Crustaceans
3. How Plants Live and Grow
4. Understanding Weather Conditions

McGraw-Hill Co. of Canada, Ltd.
(Text-Film Department)
253 Spadina Road
Toronto 4, Ontario

S.V.E. (Society for Visual Education, Inc.)

1. Electric Magnets
2. Electricity
3. Flowers, Fruits and Seeds
4. Forest Fires—Kinds, Causes, Cost and Control
5. Ground Water
6. Growing Up of the Monarch Butterfly
7. How Flowering Plants Grow and Reproduce
8. How Insects Live and Grow
9. How Plants Live and Grow
10. Identifying Common Trees
11. Living Things

Society for Visual Education, Inc.
1345 West Diversay Parkway
Chicago 14, Illinois

Unicorn Head

Unicorn Head Visual Aids Ltd.
35 Portland Place
London W. 1, England

1. The Formation of Coal

Vis. Sc. (Visual Science)

Visual Sciences
Suffern, New York

1. Magnetism

V.P.L. (Visual Publications Ltd.)

Visual Publications Ltd.
197 Kensington High Street
London W. 8, England

1. Climate: Effect of the Sun
   Effect of the Land
   Effect of High Ground
   Effect of Ocean Currents
2. Rain
3. Seasons, The, Parts I and II
4. Sun and Our Seasons, The
5. Tides, The
6. Winds

Y.A.F. (Young America Films)

General Films Ltd.
1534 Thirteenth Avenue
Regina, Saskatchewan

1. Fundamental Life Processes
2. Heredity and Environment
3. How We Get Our Cotton
4. How We Get Our Plastics
5. How We Get Our Rayon
6. How We Get Our Rubber
7. How We Get Our Sugar
8. How We Get Our Wool
9. Interdependence of Living Things
10. Structure of Living Things, Parts I and II
11. Surface of the Earth

c 1

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1959

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GRADES VII AND VIII CURRICULUM
GUIDE FOR SCIENCE --
39838092 CURR HIST

000017632100

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Alberta. Dept. of Education.
Grades VII and VIII curriculum
guide for science. -
39838092 CURR HIST

CURRICULUM GUIDE

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